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DEPARTMENTS OF VETERANS AFFAIRS AND HOUSING AND URBAN DEVELOPMENT, AND INDEPENDENT AGENCIES APPROPRIATIONS FOR 1994

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ARING

BEFORE A

SUBCOMMITTEE OF THE

COMMITTEE ON APPROPRIATIONS
HOUSE OF REPRESENTATIVES

ONE HUNDRED THIRD CONGRESS

FIRST SESSION

SUBCOMMITTEE ON VA, HUD, AND INDEPENDENT AGENCIES

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Staff Assistants

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

SPACE STATION REDESIGN

Printed for the use of the Committee on Appropriations

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DEPARTMENTS OF VETERANS AFFAIRS AND HOUSING AND URBAN DEVELOPMENT, AND INDEPENDENT AGENCIES APPROPRIATIONS FOR 1994

THURSDAY, JUNE 17, 1993.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

WITNESSES

DANIEL S. GOLDIN, ADMINISTRATOR
BRYAN O'CONNOR, SPACE STATION REDESIGN TEAM LEADER
BONNIE DUNBAR, SPACE STATION REDESIGN TEAM
MAL PETERSON, SPACE STATION REDESIGN TEAM
WALT BROOKS, SPACE STATION REDESIGN TEAM
PAM MCINERNEY, SPACE STATION REDESIGN TEAM
JOHN COX, SPACE STATION REDESIGN TEAM
NANCY BINGHAM, SPACE STATION REDESIGN TEAM
PETE PRIEST, SPACE STATION REDESIGN TEAM
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MARGARET G. FINARELLI, ASSOCIATE ADMINISTRATOR FOR POLICY COORDINATION AND INTERNATIONAL RELATIONS
JOHN GIBBONS, PRESIDENT CLINTON'S SCIENCE ADVISOR, DIRECTOR OF THE OFFICE OF SCIENCE AND TECHNOLOGY POLICY
CHARLES VEST, PRESIDENT, MASSACHUSETTS INSTITUTE OF TECHNOLOGY

Mr. STOKES. The Committee will come to order.

I want to welcome to the Committee today Dr. John Gibbons, the President's Science Advisor and the Director of the Office of Science and Technology Policy; Dr. Charles Vest, President of the Massachusetts Institute of Technology, who served as Chairman of the Advisory Committee on the Redesign of the Space Station; and also, Mr. Dan Goldin, the Administrator of NASA.

What I would like to do is to open up with some remarks; and then, of course, we will hear from each of you. And I thought we would sort of make the batting order with Dr. Gibbons leading off, followed by Mr. Goldin and then you, Dr. Vest, if that is okay with all of you.

Before I make my opening statement, Mr. Administrator would you like to introduce to the committee the other witnesses that you have with you today from NASA?

Mr. GOLDIN. Yes, sir.

We have Bryan O'Connor, the manager of the redesign team, O'Connor; Dr. Bonnie Dunbar, who is in charge of the science and technology on the team; Mal Peterson, who is in charge of costing, Mal doesn't have the energy to stand up but he raised his hand.

I would like you to know that this gentleman lived in a sleeping bag in his office for almost the whole duration of that activity, and that is the level of dedication we had from Mal Peterson and many of the wonderful people sitting here. It was just a truly heroic effort.

Walt Brooks, who is in charge of the management activity on redesign; Pam McInerney, who is in charge of procurement; John Cox, operations; Nancy Bingham, who was responsible for all the parametric trade-offs; Pete Priest, Option A; Mike Griffin, Option B; Chet Vaughan, Option C; Richard Kohrs, esteemed manager of the Space Station Freedom program; and Peggy Finarelli, who made sure that everyone was connected in the world and international relations.

Peggy, are you here?

Stand again, Peggy.

Mr. Stokes. Is that it?

Mr. Goldin. That is it.

Mr. Stokes. Thank you very much, Mr. Administrator.

Today we are here to hold a hearing on the President's recommendation for the redesign of the space station program. The President was given three basic options generated by NASA's redesign team and reviewed by Dr. Vest's advisory panel.

I might say that the President, in my view, has certainly been served well. The NASA redesign team, led by Bryan O'Connor as the Administrator has just said, worked nearly around the clock over the past 90 days.

And I join with you, Mr. Administrator, in the accolades given them. And I also express on behalf of this Committee that they deserve our heartfelt appreciation for the work that they have done.

Let me come back now to the options that were before the President. In Capsule form they were as follows:

Option B: Which, for the most part, is based 95 percent on the Space Station Freedom, at a cost of $13.3 billion over five years, plus $6 billion for permanent human capability.

Option A: Which is also Freedom derived but of a more simpler design and somewhat more modular in its appearance, at a cost of $12.8 billion plus $3.7 billion for permanent human capability.

And then we had Option C: Which is a radically different approach based on the so-called "can" concept at a cost of $11.9 billion, plus $3.3 billion for permanent human capability.

The President has chosen a modular approach based largely on Option A, with some of the essential features from Option B, including the larger U.S. laboratory and the "alpha" joints which provide the assurance of sufficient power on orbit at all times.

Now, I recognize that the President's announcement has stated only that the choice is modular based on Option A. But I think from everything that we understand, we can safely say that the direction given NASA will be essentially to base the station largely on the Option A concept with selected features from Option B.

First, let me say that while I support the President's proposal, I think it is only fair to note that our reaction to this entire scenario could easily be that we have been to this movie before.

I want to remind everyone here that it was about three short years ago the Appropriations Committees directed NASA to reduce the overall cost of the space station program because we felt that the outyear costs, which at that time exceeded $3.1 billion annually, were simply unsustainable given our budget crisis.

NASA then went back and descoped station, but what we learned more recently is that in the 1990 exercise very little was done to change the physical space station. And, most importantly, nothing was done to fix the management structure and break the so-called "rice bowls".

What actually happened was that NASA reduced the overall cost of station by taking out more than 50 percent of the reserves.

And so, when last January's surprise was revealed early this year and we learned that space station work package two, led by McDonnell–Douglas, was overrunning by $500 million to $1 billion, there were very little reserves to accommodate this problem.

When Dr. Gibbons appeared before this Committee in late March, he made the point that, unless space station outyear costs were reduced substantially, the program would squeeze out other important NASA programs.

We have also heard that before, because it is essentially the point that we have made—and when I say "we," I mean this Committee—in dealing with NASA and the station. And it is essentially the point that the Committee has made over the past two years.

I think it might be important to reflect on what the Committee has tried to get across, and I am afraid somewhat unsuccessfully, over the past 8 to 10 years.

It is interesting that the President has picked the modular approach because that is precisely what the Committee recommended at the outset of this program some eight or nine years ago.

And we made that recommendation because, back in 1985 and 1986, it was the Committee's view that the budget crisis would deepen, and the space station program that NASA proposed was not remotely affordable and would have been virtually impossible to launch.

From the very outset of the program's inception, this committee, and this committee alone, called for a modular concept or a buy-it-by-the-yard-type of approach. And the sad part is that NASA has had to learn the budget lesson the hard way. The original "twin keel" design has been down-scoped at least four times. And the President's proposal will now make the fifth.

The first element launch has slipped by more than three and one half years from the original date, and the President's proposal will now slip it an additional 12 to 15 months.

So in our view, it is not unreasonable to believe that if the Committee's original modular concept had been adopted, we might today, after having spent $10 billion, had that first yard of a useful and workable space station in orbit.

That, of course, is also water over the dam. The real question now before us is whether the President's proposal can work. And, in our view, it will only work if the new station receives the funding necessary—and this is the most important point of all—If NASA and the Congress have the will to make the necessary personnel cuts now, not in six or eight months, but now.

Unless the 30 percent reduction in civil service employment and in support contractor personnel is made beginning as we speak today, this program has no hope of ever achieving its goal.

I think what we have to all realize is that if the President's station proposal does not come cheap. The exercise that we are going through, as we speak, is to find up to $500 million to bring the space station program and its supporting requirements up to the numbers specified in the Vest and redesign team reports. I think that is going to be a painful exercise. I think we may be seeing the cancellation of some NASA programs. Because, unless NASA takes some things off the plate, space station will never reach the full funding needed to maintain this new schedule.

I don't think we want to delude ourselves that, by giving space station this priority, it will not have an affect on other NASA programs.

The budget crisis is still very much upon us. If anything, it has worsened. And so, as we look out over the coming three or four or five years, it is hard to see how NASA's total budget is going to grow.

That means that the space station program and its supportive science and shuttle requirements will cause other programs to be either curtailed or down-scoped or canceled.

So I hope that we are making the right choice here today. I am not sure personally, but I am committed to supporting the President's proposal. And we will see what occurs in the coming months.

Now I am going to turn to Dr. Gibbons and have him open with his remarks.

Before doing so, Dr. Gibbons, I want to yield to Mr. Lewis for any remarks he would like to make at this time.

Mr. Lewis.

Mr. LEWIS. Thank you, Mr. Chairman.

Dr. Gibbons, Mr. Vest, I want to express my very strong statement of support for the Chairman this morning and, in doing so, express my appreciation for NASA's effort at the President's direction.

It is no secret that those of us who have been watching space station's progressive movement have been more than frustrated by redesign after redesign. The options that have been considered here provide a broad spectrum of possibility relative to our role in space. There are those who feel very strongly that this station is a waste of money at a time when money is very dear. There are others, including myself, who feel very strongly that we have an important role to play in space; and it is the cutting edge of America's tomorrow.

I feel very strongly about NASA's commitment, not just to this design that you will be proposing today, but to man's permanent presence in space. I hope that this modular design will take us beyond the power station to a progressive evolution—something more than a power station that becomes a pod for the shuttle.

I want you to know that I feel strongly about other programs of NASA and would hope that this effort would not alter our commitment to work in the field of aeronautics. This Member's high priority to NASA is something that you will hear a lot more about as our hearings go forward.

And in the meantime, I think it is important that NASA respond to the director's commitment. Indeed, we have got to recognize that with reorganization often comes reductions in budget that involve home office budget not just mission budget. The challenges are very big ones.

I will be very interested in all of your testimony and hope to be helpful.

Thank you, Mr. Chairman.

Mr. STOKES. Thank you, Mr. Lewis.

Dr. Gibbons, in your opening remarks, I would welcome any comments you might want to make with reference to my opening statement or that of Mr. Lewis' along with any other observations that you would like to make at this time.

And after that, we will ask Administrator Goldin and Dr. Vest if they will also make their comments and feel free, any of you, to make any comments you want to with reference to our remarks.

Dr. Gibbons, I am pleased to recognize you, sir.

Dr. GIBBONS. Mr. Chairman, thank you very much. I am pleased to be before you this afternoon. My apologies for having gotten here a little late. Earlier I ran up the stairs and just missed the moment, and I apologize for that, sir. I will try to do better the next time.

Mr. LEWIS. I went to the other Committee room, too. Don't worry.

Mr. STOKES. We had that vote anyway.

Dr. GIBBONS. Mr. Chairman and Members, just about two hours ago, the President did announce his plans formally to support the development of a redesigned space station. I have brought a copy of that statement and would like to submit it with my statement for the record.

This is obviously an important decision for the future direction of our Nation's civil space program. I think we all understand that.

But before discussing that decision, I would like to briefly review the events that occurred leading up to this, for the sake of those who haven't, perhaps, followed it as closely as the Committee and some of the rest of us.

Mr. STOKES. Please do.

Dr. GIBBONS. Shortly after the President took office, he asked for a review of the Space Station Freedom program. And this was triggered out of concern over the station's continually escalating costs unrealistic projections of funding in outyears, and apparent management problems. And in March, the White House asked NASA to undertake a redesign of the space station to seek a reduction of costs while at the same time holding on to our international obligations and commitments—international participation is an important part of this activity—and also seeking to hold on to as many of the science and technology goals as we possibly could, albeit in a reduced configuration.

And to accomplish this end, we knew we had not nearly as much time as we needed or would like to have. But we committed to a 90-day space station redesign process which you are familiar with and in which a special team was put together inside NASA; and then an independent review panel of widely recognized experts, chaired by Dr. Vest, was also organized at that time.

The team was charged with developing not a recommendation but with a set of options so that we would have an opportunity to see what different kinds of commitments could result in the different capabilities and performances and time schedules. And the review panel was given the responsibility to assess and evaluate the process of the NASA study in terms of the quality of the work and the design and cost integrity.

Now, at the same time, NASA initiated a major review of the true cost of the Space Station Freedom program because in prior years it was our impression that the hard facts and implications of that program were obscured by omissions and some distortions.

For example, while it will be imperative to have an assured capability for safe return of station crew in case of an accident or an emergency, the provisions for such a capability were never included in the prior Space Station Freedom budgets. And what we wanted was a budget that really did include all that you needed to have to make that system work.

While NASA's redesign team produced three options for consideration for the review panel, two of those options, labeled A and B, are essentially derivatives or derivations from the current space station program design. The third option was one that developed in the course of this analysis. And it is a major departure from the original modular form. And I think you are familiar with it. It is a completely new concept, one of several new things that came out of this 90-day marathon.

While these three options all exceeded the initial budget target costs that we gave the design team as a reference, they do all, fortunately, offer substantial savings over what the Space Station Freedom cost had we continued on that program.

Now, on June 11th, what seems like a long time ago now but actually not many days ago, Dr. Vest formally presented the findings of the review panel to the Vice President, myself, and several others. And since that time, of course, this information has merged and the report has been published and is available as a public document.

If I could summarize my own impressions at this point, I think there are several important conclusions that I would like to highlight from that report.

First of all, all three of these NASA options are viable, viable in the sense that they can be technically accomplished. Costs were estimated with care and, I think, conservatism and would result in significant savings over the current Freedom program, which its costs are calculated on the same, consistent basis.

And that takes care—one must be careful to make these comparisons as carefully as possible. The report did find that the options most worthy of further consideration were the so-called A Option and the C Option for a variety of reasons made clear in the report.

Option A was judged to be the most desirable technical simplification and derivative both of Freedom and of Option B. So you move sort of from Freedom to Option B toward A.

The second observation is that it is important that the space station program remain an international undertaking; in fact, it could probably and will probably benefit significantly from increased international participation if that can be achieved. Considerable value was placed on the future opportunities of cost savings, utility, and general international value of pursuing in this internationalized direction, including the option of placing the station into an orbit that can reach to higher latitudes than the latitude of Cape Kennedy.

My third observation is that in order to build the space station, any space station of the sorts we have been talking about, NASA is going to need to implement major management and operations restructuring, both internally and with its contractors. And I think this reflects the earlier conclusions of this committee.

It was independently arrived at in the present time frame, but it certainly underscores, it seems to me, the heads-up that this committee gave us some years back.

After carefully considering the panel's report, the President today has called for the U.S. to work with our international partners to develop a reduced cost, safer, scaled-down version of the original Space Station Freedom.

At the same time, the administration will seek to enhance and expand the opportunities for international participation in this space station project so that the station itself can serve and the process and program of the station can serve as a model of nations coming together for peaceful cooperation.

Finally, NASA is going to be directed to implement personnel reductions and major management changes to cut costs, reduce bureaucracy, and increase efficiency.

The specific design that the President has chosen to pursue will be the simplified version of Space Station Freedom that was recommended by the review panel. We will work with this committee and with Congress, with NASA, and our international partners in the coming 90 days to optimize that design. We estimate that this approach will save American taxpayers somewhere between $4 and $7 billion over the next five years when you compare it with the real costs of funding of the current Space Station Freedom over that time.

The savings will increase to more than $18 billion over the two-decade life of the program. So we think we are talking about major numbers here, the fruits of yet one more careful examination of our options; and I must say, it is fatiguing to study and study and study. But it seems to me that until the situation is resolved that is going to have to be our fate. And I hope this is the last time around in that process, and I know you do and the other Members of the Committee.

The approach also offers a clear path for participation by our international partners, and that is a very important consideration. We have obligations and memorandums of understanding with these people. And they have committed a number of billions of dollars to this effort already.

It should be noted that our international partners did participate in every step of the redesign process and made very valuable contributions to that effort. I think this was a historic event in which our international partners literally participated with us every day of this process.

To reiterate one point, Mr. Chairman, and I want to underscore it, the Administration agrees with the advisory panel's conclusion and Committee's position that we have to redesign NASA at the same time we are redesigning the space station.

It is our intention to implement major changes in its structure and management of the space station program as well as elsewhere in NASA. We hope that it will be a model for streamlining and efficiency gains.

In closing I would like to quote one paragraph from the President's statement in announcing his support for the redesigned configuration. He said:

> There is no doubt that we are facing difficult budget decisions. However, we cannot retreat from our obligation to invest in our own future. Budget cuts alone will not restore our vitality. I believe strongly that NASA and the space station program represent important investments in the future and that these investments will yield benefits in medical research, aerospace, and in other critical technological areas. As well, the space station is a model of peaceful international cooperation, offering a vision of the new world in which confrontation has been replaced by cooperation.

And, finally, I would like to take a moment here to recognize and thank two extraordinary individuals for their exceptional contributions to this work over these past several months. One is Dan Goldin, the Administrator of NASA, who took on the unprecedented challenge of the redesigns of this space station effort; and Dr. Charles Vest, who chaired the panel of outstanding experts from all around the country in assessing that redesign work and in providing us, that is the Congress and the President, with the kinds of confidence I believe we very much needed in order to be able to move forward to them; and all who worked with them. And to their wives, I would offer my admiration and gratitude for this important service to our country, if their wives are still with them.

[The information follows:]

EXECUTIVE OFFICE OF THE PRESIDENT
OFFICE OF SCIENCE AND TECHNOLOGY POLICY
WASHINGTON, D.C. 20506

Statement of
The Honorable John H. Gibbons, Director
Office of Science and Technology Policy

before the

Subcommittee on Veterans, Administration, HUD, and Independent Agencies
Committee on Appropriations
U.S. House of Representatives

June 17, 1993

Mr. Chair, Members of the Committee, Good afternoon. I am pleased to be able to be here today to discuss the Administration's plans for NASA's space station program.

Mr. Chair, today the President announced his plans to support the development of a redesigned space station. This is obviously an important decision for the future direction of our nation's civil space program. Before discussing that decision, however, I would like to briefly review the path that brought the Administration and the President to this decision.

Shortly after taking office, President Clinton asked for a review of the Space Station Freedom program. This was done out of concern over the program's continually escalating costs, unrealistic projections of increased funding, and apparent management problems. In March, the White House asked NASA to redesign the Space Station program to reduce costs while achieving many of program's science and technology goals and maintaining international participation.

To accomplish this, a 90-day space station redesign process was developed which included a NASA redesign team, as well as an independent Review Panel of widely recognized experts chaired by Dr. Charles Vest, President of MIT. The redesign team was charged with developing options for the White House to consider, while the Review Panel was given the responsibility of assessing and evaluating those options in terms of the quality of the analyses and the design and cost integrity.

At the same time, NASA initiated a major review of the true cost of the Space Station Freedom program, because in prior years, the hard facts and implications of the program were obscured by omissions and other distortions. For example, while it will be imperative to have an assured capability for safe return to earth of the crew in case of emergency, provisions of such a capability was never included in prior station budgets.

NASA's redesign team produced three options with variants for consideration by the Review Panel. Two of these options -- A & B -- were essentially derivations of the current Space Station Freedom, and the third option -- C -- represented a completely new concept. While these options all exceeded the initial budget goals provided as guidance by the White House, they all offer substantial savings over what the Space Station Freedom would have cost.

On June 11, Dr. Vest formally presented his panel's report to the Vice President and myself. If I could summarize my impressions, the important conclusions made by that report were:

1) All three NASA options are technically viable. Costs were estimated with care and conservation, and would result in significant savings over the current Freedom program when its costs are calculated on the same, consistent basis. The report did find that the options most worthy of further consideration were the so-called "A" and "C" options. Option A was judged to be a desirable technical simplification and derivative of both Freedom and option B.

2) It is important that the space station program remain an international venture; in fact, it could benefit significantly from increased international participation. Considerable value was placed upon the future opportunities for cost savings , utility, and international value of pursuing this end, including the option of placing the station in an orbit that can reach higher latitudes.

3) In order to build a space station...any space station...NASA will need to implement major management and operations restructuring both internally and with the contractors.

After carefully considering the Vest Panel's report, the President today has called for the U.S. to work with our international partners to develop a reduced cost, safer, scaled-down version of the original Space Station Freedom. At the same time, the Administration will seek to enhance and expand the opportunities for international participation in the space station project, so that the space station can serve as a model of nations coming together in peaceful cooperation. Finally, NASA will be directed to implement personnel reductions and major management changes to cut costs, reduce bureaucracy, and improve efficiency.

The specific design the President has chosen to pursue will be the simplified version of Space Station Freedom recommended by the Review Panel. We will work with Congress, NASA and our international partners during the next ninety days to optimize this design.

We estimate that this approach will save American taxpayers in between $4 billion and $7 billion during the next 5 years, when compared to the real cost of funding the current Space Station Freedom program. These savings increase to more than $18 billion over the two-decade life of the program.

This approach also offers a clear path for participation by our international partners, an important consideration. It should be noted that our international partners participated in every step of the redesign process, and made invaluable contributions to the effort.

At the same time, the Administration agrees with the Advisory Panel's conclusion that we must redesign NASA at the same time that we redesign the space station. It is our intention to implement major changes in the structure and management of the space station program, as well as elsewhere within NASA.

In closing, I would like to quote the words of President Bill Clinton in announcing his support for the redesigned space station today:

> "There is no doubt that we are facing difficult budget decisions. However, we can not retreat from our obligation to invest in our future. Budget cuts alone will not restore our vitality. I believe strongly that NASA and the space station program represent important investments in that future, and that these investments will yield benefits in medical research, aerospace and other critical technology areas. As well, the space station is a model of peaceful international cooperation, offering a vision of the new world in which confrontation has been replaced with cooperation."

I would like to take a moment to recognize and thank two extraordinary individuals for their exceptional contributions over the past several months: Dan Goldin, the Administrator of NASA, who took on the unprecedented challenge of redesigning the space station program, and Dr. Charles Vest, who Chaired the Panel of outstanding experts from around the country in assessing that redesign work, and providing us with the confidence we needed to move ahead. To them and all who worked with them, I offer my admiration and gratitude for this important service to our country.

Thank you, Mr. Chair.

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THE WHITE HOUSE
Office of the Press Secretary

FOR IMMEDIATE RELEASE Thursday, June 17, 1993

STATEMENT OF THE PRESIDENT

At a time when our long-term economic strength depends on our technological leadership and our ability to reduce the deficit, we must invest in technology but invest wisely, making the best possible use of every dollar. That's why I asked for a review of NASA's space station program. Concerns over rising costs and mismanagement raised serious questions about a program vital to our technological leadership. I instructed NASA to redesign the space station program in a way that would preserve its critical science and space research, and ensure international cooperation, but significantly reduce costs and improve management.

NASA has met that challenge, offering a plan that will substantially reduce costs to taxpayers, improve management, preserve research, and allow the United States to continue to work with its international partners and keep its international commitments. That was the conclusion of an outstanding panel of independent experts who carefully reviewed NASA's proposals. And, that is my conclusion as well, after thoroughly considering their report and recommendations. It will take not just a redesign of the space station, but a redesign of NASA itself.

I am calling for the U.S. to work with our international partners to develop a reduced cost, scaled-down version of the original Space Station Freedom. At the same time, I will also seek to enhance and expand the opportunities for international participation in the space station project, so that the space station can serve as a model of nations coming together in peaceful cooperation. Finally, I will be directing NASA to implement personnel reductions and major management changes to cut costs, reduce bureaucracy, and improve efficiency. The National Performance Review team, led by Vice President Gore, has been essential in working with NASA to develop these management proposals. We are going to redesign NASA at the same time that we redesign the space station.

To make maximum use of our investments and meet the scientific goals we have set, the specific design we will pursue will be a simplified version of Space Station Freedom recommended by the review panel. We will work with Congress, NASA and our international partners during the next ninety days to make the very best use of this design. The details of this proposal will be delivered to Congress within the next few days. I have asked Dr. John Gibbons, my Science and Technology Advisor, to transmit a letter to NASA with more detailed instructions for implementing this decision.

The redesigned program will capitalize on the investments we have already made. However, with its deep cuts in future development and operations costs, this redesigned program will save more than $4 billion over the next 5 years, compared with our assessments of what the real costs of funding the planned Space Station Freedom would have been. Over the two-decade life of the program, these savings will grow to more than $18 billion.

There is no doubt that we are facing difficult budget decisions. However, we can not retreat from our obligation to invest in our future. Budget cuts alone will not restore our vitality. I believe strongly that NASA and the space station program represent important investments in that future, and that these investments will yield benefits in medical research, aerospace and other critical technology areas. As well, the space station is a model of peaceful international cooperation, offering a vision of the new world in which confrontation has been replaced with cooperation.

In making this announcement today, I want to recognize the extraordinary efforts of all those involved. Vice President Gore and Dr. Gibbons assembled an outstanding team of experts, led by Dr. Charles Vest, President of MIT, who assessed several cost-saving options prepared by NASA. This review included not only the design of the space station, but also the structure and management of NASA itself. Their work and the work of all those at NASA involved in this project, has been invaluable.

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Mr. STOKES. That probably is the most important part of your entire statement.

Dr. GIBBONS. And the husbands?

Mr. STOKES. And vice versa.

Thank you very much Dr. Gibbons.

Mr. Administrator, we recognize you next.

Mr. GOLDIN. Mr. Chairman and distinguished Members of the subcommittee, today America took another important step forward on the space frontier with the decision by President Clinton to continue the space station program.

We at NASA are gratified by the faith the President has placed in us to accomplish this challenging task, and we are inspired by his vision for our country's future in space.

And I especially want all the Members of the committee to be aware of the extraordinary effort put in by all of NASA's employees. And I can't be prouder of any group of human beings on the face of this earth than I am of this NASA team. And I want you all to know that and all the people in our country to know that, that they are well served by these wonderful men and women.

Only a few months ago the President charged NASA with a task many called impossible. But NASA met the challenge. People representing every part of the agency worked long hours and at great personal sacrifice and, in doing so, achieved the impossible.

We remained committed to ensuring America's competitiveness in science and technology now and deep into the 21st century. And this project will help us meet that need. The space station will be the knowledge engine on the high frontier, returning dividends to Americans for decades to come.

But there are larger issues at stake, and we are pleased that the debate over this program is beginning to encompass the landscape we know of as the future. In the wake of the Cold War, it is important for this Nation to achieve a consensus on future goals for the space program. It is important for us to ask ourselves what kinds of space program we want, what kinds of goals should we pursue, and what kind of legacy we want to leave for our children and their children.

With President Clinton's leadership and support, I believe we have the opportunity to help define a new era of international peace and cooperation through scientific partnerships in space. The 20th century has been one long panorama of war and conflict. Now the world is changing and, with luck and with vision, we may be able to replace a century of war with a new century of peace and understanding. Space cannot be left out of that equation for space encompasses the essential challenges we will face in this new age.

Over the next few months as we transition from the existing space station program structure to support the redesign option selected by the President, we will play close attention to NASA's most precious resource: its people, employees, and contractors alike. We will do our utmost to minimize disruption during the process of restructuring the program.

In a larger context, all of us at NASA must rededicate ourselves to continuing the internal improvements we have begun. Together, we have made great strides in the last year. We have begun to fundamentally change NASA for the better. But there is much more to do, and this is the time to do it.

We at NASA are honored to have been asked to participate in Vice President Gore's National Permanent Review. We must use this opportunity to set our course and make the space agency a modeler for effective research and development disappointment.

And, Mr. Chairman and Mr. Lewis, we concur with your comments that we must address not just space station but the overall management of NASA. We accept the challenge laid down by the Vest Panel, by the White House; and we do want to strive to look for all the efficiencies across the agencies while at the same time concerning ourselves that we are dealing with human beings and that they are very, very important.

So we are committed, and we take your challenge. And only by committing ourselves to these goals can we live up to the faith and trust that President Clinton has placed in us as responsible stewards for the Nation's space program. We can do no less. I look forward to working with the entire NASA family on these exciting goals during the challenging times ahead and working with this committee and other Members of Congress and the administration.

Thank you.

Mr. STOKES. Thank you very much, Mr. Administrator.

[The information follows:]

Statement of

Daniel S. Goldin
Administrator
National Aeronautics and Space Administration

before the

Subcommittee on VA-HUD-Independent Agencies
Committee on Appropriations
House of Representatives

Mr. Chairman and distinguished Members of the Subcommittee:

America took another important step forward on the space frontier today with the decision by President Clinton to continue the Space Station project. We at NASA are gratified by the faith the President has placed in us to accomplish this challenging task, and inspired by his vision for our country's future in space.

I especially want all the Members Of the Committee to be aware of the extraordinary effort put in by all of NASA's employees. I could not be prouder of any group of individuals than I am of the NASA team, and I want you all to know that our country is well served by these men and women.

Only a few months ago the President charged NASA with a task many called impossible. But NASA met the challenge. People representing every part of the agency worked long hours and at great personal sacrifice, and in so doing achieved the impossible.

We remain committed to ensuring America's competitiveness in science and technology now and into the 21st Century. And this project will help us meet that need. The Space Station will be a knowledge engine on the high frontier, returning dividends to Americans for years to come.

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It is an honor that NASA has been asked to participate in Vice President Gore's National Performance Review. We must use this opportunity to set our course and make the space agency a model for effective government research and development.

Only by committing ourselves to these goals can we live up to the faith and trust that President Clinton has placed in us. As responsible stewards for the Nation's space program, we can do no less. I look forward to working with the entire NASA family on these exciting goals during the challenging times ahead.

Mr. Stokes. Dr. Vest, we move to you now for your opening statement.

Mr. Vest. Thank you, Mr. Chairman, distinguished Members.

I am very privileged to be here today representing the 17 men and women who came together from backgrounds in the space program and industry and academia and in our military to help to review and access the work of the station redesign team.

Given the task that was assigned, its complexity, and the very short time frame in which we had to work, I want the Committee to understand that we conducted our work primarily through four subcommittees, one dealing with technical mission assessment that was chaired by Dr. Albert Wheelon, former CEO of Hughes Aircraft, and a member of the Challenger Commission; Science Application and Technology Research Assessment Subcommittee, chaired by Dr. Louis Lonzerati of Bell Laboratories, and currently chair of the National Research Council, Space Science Cost Assessment, by J.H. Chabrow, the former Director of Pricing at TRW; and Management and Operations Assessment, chaired by Dr. Mary Goode, Senior Vice President of Allied Signal, former Chairman of our National Science Board and announced nominee as Under Secretary of Commerce for Technology.

The entire advisory committee held three, two-day formal meetings and in addition worked closely with each other at the subcommittee level in drafting and working sections throughout the intense period of activity. We worked closely with representatives from the International Partners who served as ex officio members of our panel, and we interacted substantially with the NASA Administrator and with the redesign team in open, candid, and collegial manners while being careful to maintain our confidence and objectivity.

Individual Members and subcommittees also made a number of fact-finding visits to various NASA and contractor facilities. We issued a report, as has been stated, on June 10.

Before addressing, in brief, our findings, I would like to note that we believe, as a panel, that the civil space program is an extremely important part of our Federal Government and our national undertaking. And we would plea with you that it must have greater stability with respect to both goals and budgets as we move into the future.

We believe that the space station should be considered an ongoing, evolving program of scientific and technological research conducted in an orbiting, national, and international research laboratory that is an important part of the Nation's high-technology infrastructure.

I would like, now, to summarize, if I may, Mr. Chairman, very briefly some of the more major findings of our committee; and I will try to avoid some redundancies with the comments that have preceded me.

First of all, we certainly found the station redesign team to be a highly competent group, and we believe that its work has been extraordinarily effective in providing several design options having a range of cost and capability.

Scientific and technological research and development projects must be selected for the station on the basis of unique requirements for long-term residents in an orbital environment and also to the degree to which human interaction is required.

Scientific knowledge of the effects of long duration space flight on humans should be gained as background for future space exploration.

As Dr. Gibbons has already indicated, our panel believes strongly that the Nation and the international partners must consider very carefully the possibility of launching into a higher inclination orbit, perhaps that of 51.6 degrees; that would maximize the access by all of the space-faring nations of the world and also optimize the safety, the flexibility, the redundancy of launch vehicles, the redundancy of assured-crew-return vehicle possibilities and also cost containment.

Alternative orbits could also be considered. And we believe if the Nation moves forward an expeditious decision on orbital inclination is required.

As has been indicated, we believe on the basis of assessment of the criteria that we laid down that emphasis should be placed on Option A and on Option C.

Among the relative merits of these two options are the following: Option A, we believe to be a desirable engineering simplification of both Space Station Freedom and of Option B, and was our preferred approach, a modular build-up option.

Option A has an advantage over Option C in several technical and certainly in its international compatibility and capability. It also has the advantage of achieving early human-tended capability.

Option C has, in many dimensions the lowest risk, considering development and launch risk, the much lower amount of extra vehicular activity, requirements of our astronauts for orbit assembly and maintenance and potentially lower in cost.

If the space station is constructed, we strongly believe that it must be taken all the way to its end point of permanent human capability. The committee believes that spending on the order of $6 billion, simply to achieve a power station capability, would not be a wise investment on the part of the country.

Furthermore, even human-tended capability, the intermediate stage, we believe, to be a marginal capability because the presence of crew members would be limited to a 25- or 30-day duration, therefore greatly reducing the basic justification for the space station to begin with.

Options A and B are acceptable to the international partners with some concern about the level of robotics applications in A, and they have written a special section in our assessment report.

The costs of the redesign option and of Space Station Freedom were the focus of much of the committee's effort. Our review of the input methodology and conclusions drawn by the redesign team provides confidence in the realism of their cost estimates.

Our cost analysis subcommittee received voluminous data estimating reserves, confidence factors used for specific functions, and the rationale for costing assumptions. This documentation and candor gave our subcommittee confidence that the redesign team's estimates had been prepared in an unbiased and realistic manner and provided our subcommittee and now this committee with sound basis for the assessments that are presented in our report.

Let me move, finally, to a statement regarding risk. The objective assessment of risk to human life and to the long-term operation of the space station must be a major element in your decision-making. Determining factors include the amount of required extra vehicular activity by astronauts, the extent of protection against space debris, the availability of an assured-crew-return vehicle, and the need for access to the space station by more than one launch vehicle.

It is the opinion of our advisory committee that, first of all, an assured-crew-return capability must be provided. All options as currently presented are dependent on the space shuttle as the sole launch vehicle. Assured-multiple-launch access had been required by the use of expendable vehicles—the Russian PROTON, the Arian V, or the U.S. Titan IV—for lifting the heavier elements of the station.

Finally, development risks—that is the probability of road blocks and delays in design, construction, and operation of the station—is also a very important consideration and has been accessed to at least a limited extent in our report.

As has already been indicated, the level of cost reduction—and I really want to emphasize not just the cost reduction but the effectiveness and safety of this complex program—will depend on major structural changes in its management and organization of the program, both within NASA and within the civilian contractors. This will require great resolve on the part of NASA and of the Federal administration.

The NASA Administrator, in our view, must be empowered to apply lean management principles and to assign the appropriate skill base to the tasks at hand. Redundancies and overlapping responsibilities such as exist in the current management structure must be eliminated. Management layers should be reduced, and program authority and responsibility must reside in a single program manager.

As has been indicated, a reduction, at least on the order of 25 percent in total civil service and contractor employees assigned to the station program, should be implemented following principles of lean management to gain efficiency and effectiveness.

And, finally, we believe that a single prime contractor, preferably selected from among the current major contractors of Space Station Freedom, should be responsible for total system integration, including cost, schedules, and performance.

It is the hope of all the members of our committee that these findings and the more detailed findings that are presented in our printed report will be helpful to the Congress and to the administration in making the important decisions that lie ahead.

Thank you very much.

Mr. STOKES. Thank you very much, Dr. Vest.

Let me begin the questions with you, Dr. Gibbons.

Dr. Vest has indicated Option C has the lowest risk and is potentially lower in cost. Given that type of endorsement, why not pick Option C?

Mr. GIBBONS. Mr. Chairman, I think if Option C had been on the table a decade ago, that would have been a much more difficult question to answer. But when one examines the fact of the present investment in design of components that can be utilized in Option A and the commitment of our international partners, many billions of dollars, that would simply not fit with Option C. That it is an option whose time is out of place.

My personal impression is it could have been a great option if we had started out in that direction. It is basically almost a nine-story, seven-story apartment house; but it has come along at a time when we already have an investment of over $10 billion in things that simply don't match to that kind of configuration. So we would, I think, have extreme difficulties with our international partners just to start with. And we would not have been able to utilize a lot of that already committed investment that we can utilize in these other options.

Mr. Stokes. Mr. Administrator, let me go to you next and ask you what you believe the next step is? That is, where do we go from here in converting the Freedom program into the President's recommendation?

In answering that question, I would like for you to touch first on what has to happen in the next two, three, or four weeks with the existing contracts and the 1993 money if we are going to achieve the savings in 1993 in order to make the necessary transition and termination payments.

Mr. Goldin. I believe that what we have to do is, now that we have a decision by the President, we have to refine that decision.

So step one is to pull together a transition team that will take a look at the broad aspects of all the contractors, all the NASA employees, and all the issues that have to be resolved.

And I might point out, Mr. Chairman, as part of the report, that the space station redesign team—they identified a number of open issues, and these open issues were all validated by the blue ribbon panel headed by Dr. Vest. So step one is to get a transition team in place.

Secondly, we need a number of specific directives from the White House. And I believe Dr. Gibbons is in the process of working with the White House to give NASA authority to do the appropriate contractual tasks.

And until I receive that letter, I would like to hold off and defer on that subject, if I might, unless Dr. Gibbons would like to talk to that.

Mr. Gibbons. We hope to have a letter to Mr. Goldin in a matter of a several days, Mr. Chairman, which would outline our expectations in just the time frame that you are speaking of and also recognize the kinds of authorities that the President will have to give him in order to get started in this process.

Mr. Stokes. I would like to also ask Dick Kohrs if he would come up for a moment for a question, since he is the current Freedom space station manager.

And let me just take a moment and say how much this Committee has enjoyed its relationship with Dick Kohrs and the fact that not only do we think you are an outstanding public servant but this Committee has enjoyed a very excellent personal relationship with you and one where you have always leveled with the Committee, and we have been able to depend upon you for some very straight answers.

So I would like to ask you how you see the next month or two or even three unfolding in converting the Freedom design, getting rid of the support service contractors, and melding all of what you have accomplished into the President's recommendation?

Mr. KOHRS. First of all, thank you for the comments.

I basically agree with Mr. Goldin. The thing I would add to it is, the sooner you can name who is going to run the program and get that started and get this back into what I call a program environment where you can take the existing Space Station Freedom program, the team that worked so hard with Bryan O'Connor and then put that together—and I would involve the civil servants as well as the prime contractors and the subordinate contractors to mold this team into a cohesive plan, because the first thing that has to happen is that you have to maximize the savings in 1993.

And as soon as you can make those key decisions, you have to start to use that money, like you said, for termination costs and to carry into 1994 for additional reserves that will help you in 1993.

So my recommendation would be along with what Mr. Goldin said, but the sooner the better.

Mr. GOLDIN. Mr. Chairman, I might add one other point. There is one technical issue in addition to directives from the White House that has to be established and that is in the budget language for 1993. There was a specific statement made that the money was to be spent specifically for Space Station Freedom in a specific configuration.

So in addition to the tasks that we will require direction from the White House, we will have to have concurrence from the Congress to allow us to make any change that allow these savings to occur. And I believe that that will be part of the interaction we will have with the White House and the Congress. And we are duty bound to get that to you as soon as humanly possible.

Mr. KOHRS. If I could add one word of comment. As the redesign team has been working for 90 days, the baseline program has been proceeding. Right or wrong, we are spending $8 million a day, $40 million a week in this three months. We have done the critical design reviews for the three major prime contractors, and we are two weeks away today from completing the systems level critical design review for the first six flights.

I think that database that we have got going is excellent data for the new team to move out to the new configuration.

Mr. STOKES. But there is urgency in moving forward?

Mr. KOHRS. Yes, sir.

Mr. STOKES. A couple of more questions that I have to ask before I start yielding to the other Members of the Committee.

I think it is important for us to establish a few questions with respect to the money.

I would like to ask Mal Peterson if he would come up.

Mr. Peterson, what I would like to do is review the numbers for just a minute. The original space station request to us was for $2.3 billion in 1994. That amount included the so-called new technology package of approximately $500-plus million. We have a table here that describes the items within that package and their relative costs, and that totals about $500 million. The next item was the space station and the costs for the associated station requirements such as facilities, shuttle, integration, and science payloads, which were also included in this $2.3 billion. And then finally the costs of termination and transition was assumed also in that number.

Now, the least expensive option between A and B is A–2; and the costs includes the facilities, shuttle integration, and the science payloads is about $2,260,000 in 1994.

Is that correct?

Mr. PETERSON. Yes, sir.

Mr. STOKES. So if we are going to fund, for example, a tech package of say $200 million and then above the $1.85 that we currently have in the bill as a place holder, we would then have to come up with something on the order of close to $500 million.

Is that correct?

Mr. PETERSON. Yes, sir.

Mr. STOKES. Now, that is what A–2 requires. But the budget amendment that was just sent up to us includes only $2.1 billion for the space station plus $200 million for the so-called tech package. So, in effect, the station for 1994 is being allocated roughly $160 million below what the redesign team and the Vest Panel has suggested.

Am I correct on that?

Mr. PETERSON. Yes, sir.

Mr. STOKES. Now, Dr. Vest, let me ask you: Do you have any concern with that reduction?

In other words, are we getting the redesign off on a shaky start before we really begin?

Mr. VEST. Sir, I think that is a question that has to be asked of the real experts.

I do, however, strongly believe that if we do not fund the program in a logical sequence all the way through, if we artificially level the funding out, we will end up spending money much less efficiently by the time we reach the end point.

So I would be nervous about it, but I also have to say that I can only make that as a qualitative and not a quantitative statement.

Mr. STOKES. Anyone else want to comment on that?

Mr. GOLDIN. I would like to make a few comments in a broader perspective, and that is that we have some work to do relative to resolving some of the open issues.

I believe the budget numbers in terms of how we developed them in the report were correct as submitted through the Vest Panel. But we have to resolve a number of open issues and deal with some of the international interfaces and refine what we are doing in addition to what we have done with the in-depth analysis to meet the criteria specified by the White House that set up the guidelines for the redesign.

Mr. STOKES. Let me ask you this: OMB is freezing the station at $2.1 billion each year for five years. That is for 1994 through 1998. When one compares that funding curve with the Vest charts, it is clear that we are committing only to a human tenant capability by roughly the end of 1998.

And at a $2.1 billion annual rate beyond 1998, that would delay international human tenant and permanent human capability an additional two-plus years. So it would seem to us that in effect what you are recommending is truly abide by the yard concept, which is okay, but I just want to confirm that our analysis of the $2.1 billion funding rate is correct.

Mr. GOLDIN. Let me just state once again that I don't think it is incorrect. I just wanted to be sure that you understood, it was a very rapid parametric analysis made by Mal Peterson in response to the request by the staff of your committee, and that to the first order I would say that that assessment is correct, but I wouldn't want to be held to the exact dates because I would like to be sure we had a more in-depth analysis to validate it.

But to the first order, it is correct.

Mr. STOKES. Thank you.

Mr. Peterson.

Mr. PETERSON. Mr. Chairman, the parametric which essentially takes the funding that we estimated and uses a fixed variable analysis to displace the funds that are over and above the $2.1 billion, suggests that the man-tended or human-tended configuration could be achieved sometime in 1999. There is an error bar around that.

Mr. Goldin has just commented, late 1998 is possible. I believe that when we look at the run out, the one question we have to do is resolve the configuration issues that are associated with this, do the details and develop a specific strategy that goes with the funding.

When we develop the cost estimates for this, what I did with my team was develop a set of cost estimates which basically tried to optimize to a March 1997 first element launch for options A and B and then added six months of schedule reserve.

In order to go in now and look at a constrained funding case, we would have to actually develop the timing and assumptions that go with each element, payloads, assured crew return vehicle, the habitation module. For instance, it is possible to optimize reaching the human-tended configuration point by deferring the habitation module or deferring the assured crew return vehicle, or of course something like it.

In other words, there are strategies that can be developed. We have not yet done that and it would be appropriate with guidance of course from the Administration, from the Committee, to do so.

Mr. STOKES. I just have one other question before I yield. Dr. Gibbons, let me point this question to you. When we marked up this bill at the subcommittee level, in my mark, I recommended that we put in the sum of $1.850 billion for the purpose of the President's request or recommendation to this Committee ultimately.

At that time, we had no idea what the amount would be in the President's request before us. But we put that aside and the subcommittee concurred with me that we should do that at that time. Now, we have to go to the full committee with an amendment. And we have to come up with some $450 million additional.

Now, it would be my opinion or my view that most of that money, that $50 million, which we must come up with additionally now for that technical amendment, ought to come from NASA. And I would just like to get your views with reference to that.

And I base it on the fact that we are talking about an awfully large amount of money going into NASA and into space station. And with the tight budget constraints, it would just seem to me the logical place for us to garner the majority of that $450 million additional ought to come from NASA.

Mr. GIBBONS. Mr. Chairman, as I understand it, the $1.85 is the space station development itself. There would be another $250 million roughly for agency loads and associated costs and then $200 million for the tech package for aeronautics and other things.

That is entirely consistent with the Administration's position and we do also believe that this should be done within the envelope of NASA's budget.

Mr. STOKES. Thank you very much. I appreciate my colleagues' patience while we developed this for the record. At this time I yield to Mr. Lewis.

Mr. LEWIS. Thank you, Mr. Chairman. And you are taking the panel directly to the heart of this.

I am concerned that there is funding still remaining in NASA's budget from the 1993 budget that I suppose fits in this mix.

I am most concerned that we meet the challenges that have just been outlined and at the same time not totally eliminate the prospect of some very important other programs within NASA. So would you respond to that for the record, the 1993 overlap question?

Mr. GOLDIN. I would like to ask Mal the 1993 overlap. I don't remember the exact number.

Mr. PETERSON. Sir, I believe we take account of the station program, for instance, we in our analysis have assumed that we would be able to take such actions as would be necessary in 1993 to forestall the possibility of having to take termination costs in 1994, so that we have taken advantage of the funds available to us in 1993 to that extent, at least in our assumptions.

Now, to the rest of the NASA program, clearly constraints of finding $450 million or thereabouts do not come easily. And we will have to tighten a number of areas up that we probably would like to have more ample funding in.

I do not believe that at present there are any major programs that would be drastically affected. We have discussed with committee staff some of the issues surrounding it and it is clear that we have to do some things which we would rather not do if we are going to absorb that amount of funding, $450 million, from the subcommittee's initial mark.

Mr. GOLDIN. I would like, if I may, add to that. We at NASA are prepared to work with the Committee. We believe the funding must be made available. Once we make a commitment to proceed with this space station, we have to look upon this as a multi-year commitment, because, believe me, as I look at these people here who have had a weekend off to sleep and many of the management, we don't want to sit here next year and have the same issues.

So we are prepared to work with the Committee to make the money available. We have just been working with the Administration to understand the level of the number that will be available, and we believe that there are things that we can do, especially in the area of management.

And I point out that when we take a look at some of these management actions, when you take an action in 1993 and 1994, it begins building up and we are looking at these management actions over a five-year period and they have some very significant numbers associated with them. We have only begun that analysis.

I believe those things must be done. We must take a look at the level of support that we have for doing routine services to see where we could cut back and say we could do with less field service, we could do with less management support and take that money and put it into the space station.

Those are the kind of structural changes we have to look at. We have to take a look at the number of levels of management we have inside of NASA and the number of levels of management we have at our contractors. If one looks at modern management practices, one of the best places to save money is to eliminate levels of management in between the workers and the top level of management, not because you save money from those jobs, but because the communications becomes so more—so much more effective, that the productivity of the workers goes up.

So I believe these are the areas where we can do things. There are some very difficult decisions we have to make and we are prepared to make them. And I might point out in one circumstance, I sat before this committee a few months ago and the question was asked, Mr. Goldin, if a program reaches a threshold point, are you prepared to deal with those issues?

And we did in one circumstance where we saw a program suddenly running out of control on cost. We are not funding that program anymore. It is a commercial venture and we have told them that NASA is not going to put any more money into that program and the commercial venture will have to make it or break it by itself.

We will make those hard decisions. We are prepared to make those hard decisions, because we want to have continuity in this program and we want to have continuity over a five-year period, not a one-year period.

Mr. LEWIS. Well, Mr. Goldin, as you discuss significant management changes that involves very significant shifts.

I mentioned in my opening remarks the prospect of the committee considering assistance with early retirement considerations. In other venues that I have responsibility for, we are talking about that. I just wonder why those kinds of considerations don't apply here.

Mr. GOLDIN. They do and I should have mentioned them and I am glad you asked the question. Let me just talk a little bit about the civil work force first, because there is a process that is mandated by legislation to us. It is called a RIF, reduction in force.

It is a very debilitating activity that takes place, and if we were to do that, we would lose a whole incoming generation. We right now have 4,000 people eligible for retirement, and each year it goes up by about 1,000 people.

We feel if we had some help from the Administration and the Committee to have a buy-out program or an early-out program, which is a voluntary approach, rather than a forced approach, it provides an opportunity for all to really help get the human power levels down without having tremendous disruption.

So we are in the process of working with the White House to draft up appropriate language and we would really like to seek the support of the Committee to get this language through. However, the initial savings will be less in 1994 than it will be in 1995 and 1996, because as we have to execute it, we have to pay that extra package to buy out the individual retirements.

But it will have a very significant impact on the agency over a five-year period.

Mr. LEWIS. Okay. We have had some very interesting discussions, about reserves, whether they were adequate or not, and where they should be distributed.

Dr. Gibbons, has that been discussed by the administration?

Mr. GIBBONS. Not specifically to my knowledge, but I am sorry, I will have to get an answer for you, Mr. Lewis.

Mr. LEWIS. Dr. Vest, did the commission look at the reserves and their impact upon the program in the past? Did you have any recommendations regarding distribution?

Mr. VEST. I think that a more accurate statement is that our costing subcommittee felt that it could certify that the level of reserves that Mr. Peterson and his colleagues had put into the funding plan, as presented to us, appeared to be adequate.

But I don't believe that we got into projections in different scenarios.

Mr. LEWIS. Mr. Goldin, then would you comment?

Mr. GOLDIN. Yes, I will.

Mr. LEWIS. We need to get this right this time, it seems to me, if we are not going to have another redesign or decision to terminate.

Mr. GOLDIN. We took two approaches to reserve and I would like to give a broad overview, and then I would like to ask Mal to give you some more detail.

I personally called in members from industry and asked them for their guidance on how they develop reserves for their programs. We spoke to other government agencies to collect data on reserves. We collected this data, synthesized data, and provided it to the redesign team.

We asked that they look at reserves both in schedule and in dollars. After they did that, we wanted to make sure that we validated that. We had weight reserve and power reserve, because those too can get converted into dollars if you get into trouble. So we specified that.

In addition to that, we asked the cost analysis team to take a look at potential risk areas in the program. So after they laid in a level of reserve, they put in an account called APA and said we may have a potential problem here, so we want to put some money against that potential problem.

So we broke it into two parts and we did tops down, bottoms up, sanity checks on it, and that was the process that we used.

Mr. LEWIS. Well, you know, we have had some differences of opinion here.

Mr. PETERSON. Congressman, I don't know how much detail you would like to have, but we did of course from the standpoint of getting the reserves calculated, we went through system by subsystem for the data management system or the environmental control, life support system, and generated an assessment of the relative risk level residual in the program based on its being at or having completed its critical design reviews.

And what was new to the program, for instance option A has some new things, those new design work got a higher level of reserve than hardware that was at the critical design review stage. Hardware that was off the shelf got a lower percentage yet.

Operations costs received a 25 percent reserve across the board. Partly——

Mr. LEWIS. 25 percent?

Mr. PETERSON. Yes, sir. Partly because in the process of reducing our operations cost estimates, a laudable achievement by the team that was at work, there is a certain tendency to overestimate the savings that are possible to be realized.

We wanted to be sure that we did not err on the side of over optimism and not apply sufficient reserves to cover the possible breakage after further review of their proposals. So the bottom line is we went through carefully system by system. We looked at them in aggregate, we looked at them in phase.

In terms of the allowance for program adjustment and the APA account as we referred to it, we put in some specific allowances for areas that we had concerns about, either technically or from a programmatic standpoint. An example of that would be, for instance, the size of the laboratory racks or number of laboratory racks in the option A, we realized was a concern to the user community.

And there were similar things of that character.

Mr. GOLDIN. Might I also add that one other thing that we did was we asked the costing team to take a look at all three options and make sure they had them all balanced out, and there was a set of costing ground rules.

And if I recollect, it was a new system or subsystem was 35 percent reserve, and if it was an existing subsystem, it was 10 percent reserve.

Mr. LEWIS. Leaving contingencies for new——

Mr. GOLDIN. Leaving contingencies for unknown problems. And after it was all done, I asked Mr. Peterson to put a six month reserve at the end of the schedule that would be owned by the program manager. And that I felt was prudent so we don't have to keep coming back and saying, well, we had a surprise. And we costed out the span time for that six month reserve and it is against each one of the options.

This is a prudent approach that is normally done in industry when you undertake this. And one of the reasons I asked the Committee to have a little caution in the parametric analysis that Mr. Peterson has done on the level funding approach, is that if you know in advance that the schedule is going to slip, you will take a look at your schedule reserves in a different manner.

And I am a little bit concerned about drawing some very rapid conclusions about the fidelity of the number that Mal Peterson came up with because of that. So we need a little bit of time to respond to the Committee in terms of what is the schedule impact of those level funding activities.

Mr. LEWIS. I would appreciate some elaboration for the Committee.

As we are about to break, Mr. Chairman, I wonder if I shouldn't raise a hot button. I was taken to the question of station funding and it's potentially adverse impact upon other important programs.

And one of those programs, if it is all right with the Chairman, from this Member's perspective within NASA's 1994 proposed budget of $15.26 billion, is an $80 million item for hypersonic flight, research and technology known to most of us as NASP. This is supposed to be a joint DOD and NASA project.

In the two previous fiscal years, as you know, DOD has put up $349 million, while we haven't been a participant. We have got a small amount, just kind of as a plug to say, hey, we are interested.

I would like to know that NASA is also absolutely committed to hypersonic flight and research.

Mr. GOLDIN. Let me respond. And I am very interested in what you said, Chairman Stokes. Given the $15.3 billion sum, I believe we understand how to work the prioritization.

We have to understand the level of funding that the Committee has set forward for us, and then we are prepared to deal with the priorities. And I think we may be talking about two different levels.

But I am talking about within the President's budget request of $15.3 billion, I think we could understand how to work the issue. Now, if we are having to design to a lower number, then we are going to have to work the priorities.

And I want to assure you, we are prepared to work the priorities and make the decisions and I made my response at the $15.3 billion level.

Mr. LEWIS. I heard you. Very good.

Mr. STOKES. That is the problem we have. We don't have the $15.3. What we have is something like $14.450. And I don't know how you put that, the $15.3, into the $14.5.

I mean we have got the President of MIT here. Maybe he can help us do that kind of mathematics. There is a vote on the Floor and are you finished, Mr. Lewis?

Mr. LEWIS. I am. I appreciate your letting me go on like that, Mr. Chairman, because I thought it was important to lay it out there.

Mr. STOKES. Sure.

Mr. LEWIS. This committee has got to struggle with that, and the reality is I am going back to the defense subcommittee tomorrow morning, to urge them to come forward with their full funding of the NASP.

The first question they are going to ask is what kind of commitment does NASA have to this NASP initiative. And you know, they are entitled to a response. Otherwise, we might as well take that piece of the program and go totally to the defense subcommittee.

Mr. STOKES. We will take a short break to go vote and come right back.

[Recess.]

Mr. STOKES. The committee will come to order. Mr. Mollohan, I yield to you.

Mr. MOLLOHAN. Thank you, Mr. Chairman.

Gentlemen, I would like to add to the welcome extended to you by the Chairman and the Ranking Minority Member. We have heard a lot of talk today about finding savings, in the space station program and I believe I heard several of the witnesses testify that a very large percentage of the savings has come from management efficiencies resulting from reorganizations and downsizing.

Could you give us an idea of what percentage of the savings found in each of the options is attributable to management?

Mr. GOLDIN. Walt. Walt was in charge of the management activity on the redesign team and I think he has the precise numbers.

Mr. BROOKS. Mal Peterson has got the numbers that we used, but they roughly are 15–15 percent effect, which comes to about $300 million in the first year starting in 1994 that are distinctly attributable to management efficiencies.

We did a parametric analysis of that based on inputs both from the contractors, from our own people within NASA, and based on modeling other programs that have gone through transformations like this to streamline management structure.

Most of those indicated a savings that was potentially larger than that, but they started early in the program with this kind of a restructure. We are fairly deep in the program. We are at CDR, so that is management savings booked conservatively at the 15 percent level.

Mr. MOLLOHAN. So each one of the options incorporated that has management savings as you projected the costs; is that correct?

Mr. BROOKS. That is right, but the A and B options did it—we kept it in a different way. Since we have a baseline that we are working from right now with the Freedom Program, we were actually able to take that staffing level and then do an analysis, a grassroots analysis and a parametric analysis, and establish these 15 percent numbers.

For Option C, because it was quite a bit different, that was built from the bottom up. And we actually used essentially what we call a cost estimating relationship. We used what is called a RAPS terminology and we did an analogy to previous programs, but we didn't deal off of the current baseline.

Mr. MOLLOHAN. Okay. That is really my question. What baseline did you use to make assumptions about applying these management efficiencies to the current station design?

In other words, did you apply the same management efficiencies to the design, assume they were effected, and then take that as your baseline number to compare it against the other design to compute your savings?

Mr. PETERSON. The answer is yes. We did take—we departed from the current baseline. In other words, one of the significant issues was how much savings we could realize from streamlining the management from delayering it, from going to a—going from a multiple prime contractor arrangement to a single prime contractor and giving that prime contractor integration responsibilities.

Mr. MOLLOHAN. So you applied all of those assumptions across the board, in addition to the current station program, and then you got your baseline, the current station program, after you effected those management savings assumptions, and then that lower number for the station was what you used to compare the other designs to?

Mr. PETERSON. No.

Mr. MOLLOHAN. That is how you came up with your savings?

Mr. PETERSON. I am sorry, option B, sorry for the terminology here, but option B is essentially the current Space Station Freedom designed from a technical and programmatic standpoint. To that design then we are applying procurement, management, and operations cost reductions as a function of those explicit things that I just mentioned.

Mr. MOLLOHAN. OK. Option B, the number you come up with option B then is essentially a number that is derived from applying these management savings?

Mr. PETERSON. Yes, sir, there are some minor technical differences in the data management system, as an example, for option B. But to the first order, it is the baseline space station program in its technical approach, but not its procurement and management approach.

Mr. MOLLOHAN. Is that $5.8 billion in savings?

Mr. PETERSON. Well, I believe it depends on what time phase you are asking the question through.

Mr. MOLLOHAN. That is the number I have here as summarized by the advisory committee.

Mr. PETERSON. And I think—oh, yes, sir, OK, I do know where you are. Yes, that $5.8 billion is essentially the funding through permanent human capability of the planned preexisting space station plan versus one of the current options.

It includes, by the way, when we say development and operations, through the year roughly 2000. Basically it is through the point at which you finally have enough hardware in space to have reached permanent human capability.

Mr. GOLDIN. Mr. Mollohan, I would also like to add that one of the things that we laid down at the start of the study was to not have any management challenges and not deal with management efficiencies. But if you made a cost reduction, you had to take a specific action. Would you consolidate a set of activities?

For example, we consolidated all the operations into one facility instead of multiple facilities around the country. Did we—you know, going to a prime contractor, so there were specific tasks associated with it, and it wasn't a station where we said we will sharpen the pencil and get more efficient. So I would almost prefer saying we have management reductions than management efficiencies, because management efficiencies usually has a connotation of a challenge rather than a specific action.

Mr. MOLLOHAN. OK. A reorganization, management changes, different way. OK, thank you.

Doctor Gibbons, in an earlier hearing before this subcommittee, you suggested that the international cooperation aspect of the space station program was one of the most important reasons that you advocated the Clinton administration continue a space station of some kind. Your statement was really in response to some of our discussions. Is the Administration committed to taking the space station program to the human phase, or is the recommendation we have here going to fall short of the point where the international hardware would be deployed?

Mr. GIBBONS. No, we are interested in going to the international phase.

Mr. MOLLOHAN. Okay. Information that I have received would suggest that the administration is committing to approximately a $10.5 billion station. If so we will not reach international capability—under option A we need about $13.4 billion and under option B we need about $16.4 billion to get the international participation. Is that correct?

Mr. GIBBONS. What you need is more time, and the partners understand that they are going to have to accommodate to a longer time before they can be part of this activity, unless some other break occurs. If someone wants to give them a free ride into orbit or some other development occurs, then the time might shorten.

But the trade off for these costs, lower cost numbers, is a stretch out in the time in which the international partners are on board and operating.

Mr. MOLLOHAN. Well, what kind of concerns are they expressing about these issues and how is that going to affect their desire to participate in this program?

Mr. GIBBONS. We have just—in fact, I might refer that question in a moment to Mr. Goldin, he has received responses from all the partners. But my understanding is we have had to make this notification within the last 24 hours, they are prepared to go with this on the President's plan.

Mr. GOLDIN. Yes, in fact I have a letter from two of our partners already, and we understand that we are going to get letters from the other two partners. And the general conclusion was that they welcome the President's decision, they look forward to continuing our cooperation, they plan to work with us to develop the optimized design for the selected configuration.

Mr. MOLLOHAN. I am sorry, who is "they"?

Mr. GOLDIN. ESA, NASDA——

Mr. MOLLOHAN. You are summarizing all their attitudes herein?

Mr. GOLDIN. Yes, right.

Mr. MOLLOHAN. They all have the same?

Mr. GOLDIN. In general. We got two verbal and two in writing.

Mr. MOLLOHAN. I interrupted you, go ahead.

Mr. GOLDIN. They plan to work with us to select an optimized design for the configuration, and they see this as important, not only for space cooperation, but for broader science and technology cooperation with the United States. So I think that the international partners are concurring with us and we are prepared to work with them on the final details.

Mr. MOLLOHAN. Dr. Vest, you had international representation in your advisory group, did you not?

Mr. VEST. Yes, sir.

Mr. MOLLOHAN. Can you summarize for us their attitudes and what some of their concerns may have been?

Mr. VEST. I think that the international partners that worked with us entered this exercise with very deep concern that a combination of budget cuts and redesigns might leave them in one of two situations, either one where they no longer had a part to play, or the part that they had to play was reduced in its importance. Their basic position was that they preferred the kind of modular approach that the President has ended up recommending.

They did not feel that option C afforded them the substantial role in the build up of the station that they wanted to play. I think it is fair to say that, particularly from the Canadian Space Agency, but also shared by the other partners, there was some leaning fairly strongly toward option B because it makes heavier use of the Canadian robotic manipulator, and so forth.

But I think that the President's recommendation has come along the general direction that the international partners pushed for all along. And I must say, if you will permit me a little side bar, that I was extremely pleased with the candor and openness with which all of the international partners worked together, both with our committee and with the redesign team.

Mr. MOLLOHAN. Do they know the funding level, Mr. Goldin?

Mr. GOLDIN. I believe they do. I don't know all the levels of details. I mean, this has moved very, very rapidly.

But the thing that we are committed to do is exactly what Dr. Vest talked about, is to be open and candid with our partners and work with the issues.

Mr. MOLLOHAN. I understand. But the positive reaction that you have described here today, have been expressed at a time when they were aware of the funding levels?

Mr. GOLDIN. I believe so.

Let me ask, Peggy.

Ms. FINARELLI. I don't know.

Mr. GOLDIN. You don't know?

OK, I have to say that is uncertain.

Mr. MOLLOHAN. Will the station orbit at an inclination of 51.6 degrees in order to accommodate Russian participation in the program?

Mr. GOLDIN. No decision has been made relative to the orbit. We have had preliminary discussions with the Russians. We started it late in the redesign process, and we just have not completed it. And again, I will be awaiting instructions from the White House in terms of the transition process, so we can continue to consider such things as which inclination we are going to be in.

But at the present time, our baseline is at 28.8 and we will have to have some further discussions and consultations with the Russians and our international partners before we change that.

Mr. MOLLOHAN. As you say, those decisions were being made very quickly.

In what time frame are you going to make the decision about Russian participation?

Mr. GIBBONS. I might respond briefly to that. We know that Vice President Gore is meeting with the Chairman of the Council of Ministers, Mr. Chernomyrdin, at some point in the near future, probably within the next month. And it I think will be very important and helpful to him to have sufficient flexibility going into those discussions about this matter so that they can be a matter of negotiation. And, therefore, I would suggest that we try to hold that as an important element, that if we could be flexible through this period of the next month or so in that regard, I think it will be very helpful. And that doesn't mean we can't move ahead, because the orbit inclination number affects certain things downstream, but not the basic design of the station itself.

Mr. MOLLOHAN. Thank you, Dr. Gibbons.

Thank you.

Thank you, Mr. Chairman.

Mr. STOKES. Mr. Chapman, I yield to you.

Mr. CHAPMAN. Mr. Chairman, thank you very much. I would like to address my first question to Dr. Vest. I suspect I know your answer, but I certainly know what Mr. Goldin and Dr. Gibbons would say about my question. I would like to ask you a fundamental question about your view of America's civil space program, and whether or not it is your judgment, having gone through this extensive redesign effort of our space station project, that the station program itself is important enough to make the necessary cuts we are going to have to make within other NASA programs? Clearly, those cuts are going to require the cancellation of some projects and programs, and the reduction or a reconfiguration of others.

In your judgment, is the level of funding commitment to space station for the next few years important enough to inflict the pain that is going to be required to be inflicted to the rest of NASA?

Dr. VEST. Mr. Chapman, in order to answer that question, I think you will have to indulge me for a moment to lay out a view and a perspective. It is not a simple binary question. And I must preface it by indicating very clearly to the Committee that our advisory committee was not charged with answering the question: Should the Nation move forward, should it not, or even what option should it choose?

We did not as a committee examine the question that you have asked. So in addressing your question, I can only speak as an individual.

Mr. CHAPMAN. That is how I asked the question.

Dr. VEST. If that is understood, I will be glad to do so. My personal opinion is that NASA has three fundamental and extremely important roles. One is to promote, develop the knowledge, develop the technology, and develop the experience to keep humankind moving forward, away from the planet earth and into space.

Its second role, fundamental role, in my view, is to enable and conduct basic scientific experimentation, scientific research and the universe, on plan, et cetera, and now on our own earthly environment.

And its third basic function, in my view, is to promote the development of advanced technologies in aeronautics. I think that civil aeronautics is an area that we have not paid sufficient attention to in NASA in recent years.

So I can only answer the question by saying that if we are able to fund a station that is somewhat simplified from where we started out, in order that it be effective and safe and keep its costs from growing out of control, if it is possible to do that without doing drastic damage to our basic science program, space science and earth atmospheric science, and enable us to get a timely start on getting back heavily into the area of civil aeronautical research and technology, then I would like to see the Nation move forward with the station.

If in the overall scheme of things it is not possible or realistic to achieve significant progress in all three of those goals, then I think a different conclusion might be reached.

Mr. CHAPMAN. Let me ask your opinion again, recognizing it is your personal opinion, that if there were no space station, then is the follow-on consequence of that a serious reduction or elimination of the shuttle program? The House will address whether or not there is going to be a space station within the next week or 10 days.

Dr. VEST. I honestly do not feel that I have the expertise to answer that question. I have not undertaken an in-depth study of the structure of the NASA budget for overall program, but I think on a somewhat more philosophical basis than perhaps this committee would like, those are my views. But I cannot really quantify the specific tradeoffs.

Mr. CHAPMAN. Dr. Gibbons, there has been some discussion about a large part of the details of what we are about here today that are still undefined. One of the areas that may be the least defined is the future role for the Russians in the space station.

Their active involvement in this project in the future may be a wild card out of the control of the administrator. To what extent have we at this point been able to address first their participation, and second, depending on how that is defined, what it might do to either the cost or the schedule of a space station?

And I will say with absolutely no bias that a real concern I have is if we get too eager to involve the Russians in this project we may run the risk that we could do some damage to our own program and perhaps do some pretty serious damage to a lot of American jobs? I would like your comments about that.

Mr. GIBBONS. I think the Russian card, as you say, is an important one to think about, although I don't want to speculate about it too much today, because I think in doing so, I might undermine the Vice President's capabilities for his negotiations in the coming weeks. The fact is we are in a game with Russia now, a game of their survival and transformation to a market economy and removal from our card of costs that came out of a long Cold War.

We could know that the Russians are very inventive people. They have excellent science. And that they are also an underdeveloped country, but that one of their very important technological assets is a space capability in both equipment and know-how, that could in fact be very valuable to us in a joint effort.

At the same time, developing a relationship with them could conceivably be of considerable benefit in helping that government move ahead toward greater stability and closer to a market economy. So it is a card game, but I think it is not so wild. I think it may be high stakes, but it also could have some very important outcomes.

And I would repeat, the reason why I think we should be most interested in it is that we have a lot of self-interest in what happens to Russia. We have a lot of interest in what we might be able to save and gain by spreading our partnership to additional nations, including Russia, and the timing is, however created, the timing very interestingly looks like the middle of this summer is when things begin to shake out.

I am sorry I can't—I dare not speculate further at the moment.

Mr. CHAPMAN. Let me ask Mr. Goldin, would you dare speculate further about the impact?

Mr. GOLDIN. Do you really want me to answer?

Mr. CHAPMAN. Well, you are going to have to come before this committee in months and years ahead and explain what went wrong, if anything does, with the Russian involvement and how that interface is working.

It appears to me that their involvement creates a number of problems, not the least of which is that most of those folks don't talk the same way you do. When you are talking about streamlining management and improving communications, I don't communicate very well with someone that speaks Russian, but maybe NASA can.

I am just curious of your view. It appears to me that it is a bit of a wild card and that while it may further our foreign policy objectives, I wonder if it furthers the objectives of having a good space station, that does good science and that we do it on schedule and on budget?

Mr. GOLDIN. I would like to answer that in a number of different perspectives. First, let me say that we are living in a new world. And I felt exactly the same way you did until I sat in my apartment with another Russian who heads up the U.S.—the Russian Space Program, and we didn't speak the same language, but both of us found that we built weapons and we played hunt and peck together, because we both had various security restrictions on what we could say, but it was clear that he built weapons aimed against this country, and I built weapons aimed against his country. I spent a major portion of my career doing that.

It also became clear that both of us felt that if we go into a new world, it is going to be a world where instead of a world defined by competition, and President Kennedy defined that competition with the Apollo Program, we are going to have to have a world that has some cooperation. So my point is I think that a future space program of the 21st century, if it excludes the Russians and doesn't include them, I think as a world people, we are going to lose something.

Can we manage it? Yes, if we don't make an integrated team, but that we have specific tasks that are done by the Russians and specific tasks done by the Americans. I believe the Assured Crew Rescue Vehicle is a perfect example of how we could work with them and not have the government in the middle of it. And, in fact, the way we are working the docking mechanism, which is going on right now, Rockwell was given the responsibility of procuring the docking mechanisms from the Russians.

They have the subcontract, the government is out of the middle of it then, and they are procuring that, as they are procuring it on a subcontract. If we were to work with the Russians on a space station, it would have to be task oriented, not just one happy team, but very specific tasks, very specific assignments, very clean interfaces.

When we married up the Apollo Soyuz mission, we had "X" wires and "Y" bolts, and that is the way we ought to do it. But I wouldn't see a program where everyone does everything and we have a management nightmare.

We would be very focused, very specific, and we would have a process where we would not have the Russians on every critical path that we were working on, that we would have some flexibility. I think it is possible, but I wouldn't want to go to a program where everyone is doing the same thing and integrated together.

Mr. CHAPMAN. Mr. Chairman, I am mindful of time limits here and I don't want take up too much time. There has been some discussion here that there are going to have to be some very important decisions made quickly about the management at NASA. Some of the savings, in fact, a substantial portion of the savings that are projected have to do with changes in the structure of management at NASA, as it applies to this program and to the application of the management at the agency, generally.

I view, initially, at least, that involvement of the Russians in the project is complicating what is already going to be an enormously difficult task. You are going to have to make decisions that are not going to be any fun to make. Those decisions are going to have to be made very quickly in order to accomplish those things that are mandated by both the decision that the President has made and the parameters and guidelines that the Congress will impose on the project when it is approved, if it is approved.

You worked under enormous pressures, and extremely well I might say, in the last 90 days. Can you lay out for me the scenario in the next few weeks that you anticipate how you are going to affect the savings and streamline the management that is required? You are bound to have had discussions about the contractor community since some of those contractor contracts are going to have to be terminated or altered.

This process is going to involve a lot of people, both at NASA and in the private sector. What is the scenario you see and how you will proceed for the next 90 days?

Mr. GOLDIN. I would say that whatever is going to happen to this space station must happen in the next 90 days; and if the Russians are to be involved, they would have to be a part of that process. The window is closing. Now is the time. Once we go through this process, that is it. We can't come back and revisit it. So timing is everything.

We would have to define a very specific set of tasks for them, and we would have to have clean interfaces. If we could not do that, it would not be possible. I believe the assured-rescue-vehicle is the right answer.

There are other specific things in mechanical hardware that the Russians would do with clean design approaches and clean interfaces. That is the approach that we are taking.

Until proceeding otherwise, we are proceeding down the pike; but the window closes in 90 days. We cannot do much more after that 90-day period.

Mr. CHAPMAN. You are talking in terms now of a new prime contractor in the management structure.

Do you have the authority now you need to be able to make those decisions?

Are you going to need additional legislation from the Congress to do what is anticipated to be required to do?

Will there be anything that this committee or the full Appropriations Committee or the Authorizing Committee may need to do?

And do you see NASA in the next 90 days putting in place the structure to make these things happen?

Mr. GOLDIN. NASA will have to be given the authority for making the decision on the prime contractor by the White House.

I am not sure I know the details of the legislation involved, and I don't know if Dr. Gibbons knows it.

Mr. GIBBONS. We are looking into that situation right now, and we hope to have that resolved in the next couple of days.

Mr. CHAPMAN. OK.

Mr. Chairman, let me just say for the record that you know how supportive I am of the program and appreciative I am of the hard work that all of you and all of the folks that have been a part of this effort have undertaken.

Next week there is going to be an unbelievably talented group of physicians in this town who are going to testify before the space subcommittee about their vision of what the space station can mean to medical science in the future years.

In fact, it is my understanding that both Dr. Debakey and Denton Cooley may be a part of that hearing. And I don't believe those two gentlemen have been in the same room for a couple of decades for reasons that are unrelated to this. Mickey LeMaitre who runs M.D. Anderson Cancer Institute in Houston, and others, will also be involved.

I am excited about the prospect of the testimony they will present about what space station can mean to medical science in the future. I just wanted to bring that up and advise you. I am sure that you were aware, but others may not be, that there are a lot of people who know what the station can mean and what the station science can do.

I thank you again for the hard work.

Mr. GOLDIN. I personally met with each of those gentlemen, and I believe if America had a chance to hear what they had to say, there would be no argument on the space station.

Mr. CHAPMAN. I hope that we can give America that opportunity.

Mr. STOKES. Ms. Kaptur, I yield to you.

Ms. KAPTUR. Thank you, Mr. Chairman.

I would like to welcome all the witnesses this afternoon and, Administrator Goldin, particularly you. You have had to keep the morale of your agency high; and I know that this must have been difficult. I know how we feel on this subcommittee when we are waiting for our mark from the Budget Committee and from the Chair of the full Committee. I have some minor understanding of what you must have been through over the last several weeks, and we thank you for working very hard to meet the President's request.

I just have three questions. I wanted to ask you if, by chance the redesigned space station were to be canceled, how would you reprogram those funds. Say a portion of them were remaining, where would you place those within the agency?

Mr. GOLDIN. First, I would be in complete and utter shock if the space station was canceled, because I would like to add on to a question that someone else had brought up, Dr. Vest, I do believe, if space station is canceled, we are making a decision to shut down the human space flight program in this country; so it is a very momentous decision, and that is a very big problem because then I would have to say, what is the destination for the shuttle?

So that would be part of the broader ranging answer that we have to look at. And then I would say, where is NASA going relative to the three objectives that Dr. Vest has outlined. And we would be losing one of the major three objectives. And, in essence, NASA would be an agency that would build robotic spacecraft and perform in aeronautics.

So the obvious answer would be to spend more money in aeronautics and robotic spacecraft. But my feeling is if the money was canceled for Space Station Freedom, I don't think NASA would save a significant portion of that money and it would appear some place else. I know not where. I have been in the industry 30 years. I have had to go through layoffs.

When I was in industry, I had programs canceled; and I told Mr. Goldin what would happen with the money if this program is canceled. Well, the money vaporized; and I had to send thousands of people out the door. It is not a pleasant circumstance, and I personally got very sick when that happened.

Ms. Kaptur. You referenced my next question, and I didn't hear some of the prior discussion on manned space flight, but I was going to ask you if space station were completely canceled, what other plans were on the drawing boards at NASA in trying to have any type of manned space fight? Do you view the concept of space station Freedom as your only option?

Mr. Goldin. Right now it is. It would take us a number of years to—if there is no space station, then the question is where does the shuttle go. And if I don't want the shuttle, should I redesign the shuttle? Should I start going to the moon?

You can't go to the planets unless you understand how humans can live and work in space and that is a critical element of human space flight. The other thing we will lose is the ability to do microgravity research in space, which the members of the Vest Panel have validated that it is fundamental research that applies to life on earth here today. So we would be losing out on that. I would worry about the whole human space flight program if it was canceled.

We do not have anything on the books, no destination for the shuttle without a space station, right now; and it would take us 5 to 10 years to recover. And in the process, the industry that supported it would have no base of support. So we might set the human space flight program back 10, 20 years.

And the sense is—maybe I am talking too long—the human space program is not like a switch. I don't think we could shut it off and wait five years and turn it back on. I think we will lose the industrial capability. We would have to deal with it, but that would be a major problem.

Ms. Kaptur. A lot of the crystalline research and other scientific research that is proposed for the Space Station could, however, be done through unmanned space flight.

Is that not correct?

Mr. Goldin. I think Dr. Vest testified that it was the opinion of the blue ribbon panel that permanent human presence was required to do the quality of the research that was necessary.

And I might want to refer the question to Dr. Vest, rather than speak for him.

Mr. VEST. That is a correct statement. And obviously it is a kind of question in which all of the above are correct. There certainly is a level of research in low-gravity, both, biology and low-gravity material science, which are the two pulmonary scientific drivers here that could be done robotically. But it cannot all be done that way.

And what we tried to be clear about was that the science that goes aboard the space station should be that that requires significantly longer than 25 or 30 days in orbit, and it does require a lot of human interaction. That tends to apply, according to my understanding, even more heavily toward some of the biological research than it does to materials research.

But the answer is clearly that there are certain things that can be done and very long duration flights that require a station that cannot be done other ways.

Ms. KAPTUR. Could I ask a very naive question: Why would we want human beings to live in space? We are investing billions of dollars on behalf of the American people to create situations in space where people can live or work or do research.

Why should we be doing this?

Mr. VEST. Well, I can again give you only a personal view. I simply believe, philosophically, that it is humankind's destiny to, at some point, move beyond the bounds of earth.

I think that it is part of the great human adventure that we explore both innerspace in our organizations, explore our atmosphere, our forests, or lands, and ultimately the planets and beyond.

So despite the fact that a moment ago I put some caveats on the way in which we pace and achieve this, I believe it is our destiny and that the whole human spirit of exploration, of understanding the unknown, of recognizing that there are things to be learned out there that we cannot predict, are very important part of human life.

And I hope that this Nation can continue in some way to lead that effort, despite the McDonnell–Douglas, nearer-term and closer to home issues we have. I think we have to be doing a few heroic things and a few very far-sighted things if we are to be human.

Ms. KAPTUR. Lets move from the sublime to the practical. I wanted to ask one final question.

In terms of the budget, if I look at the current program, the numbers that I have indicate that total cost at completion, without overruns, if the program were not to be changed, at least $33.5 billion.

Under the option, I guess, A–2, we are talking about $16.5 billion at completion, halving the amount that we would have spent on space station. I am trying to get the numbers correct reading through what I have here. I am trying to understand-what would be your projection for the current program at completion?

And with a redesign program, what would be your total costs at completion?

Mr. GOLDIN. Do you have that summary chart?

Could you read the numbers?

Mr. PETERSON. The current space station program, as it was last fall, which is to say before these things, the redesign effort was kicked off and a number of things occurred, that program was estimated to cost, through the 10 years worth of operation—it actually, by the way, had a 30-year operational life—it was going to cost on the order of $65 billion. That includes a lot of things, civil service and shuttle marginal costs; and it includes the costs that we have already expended, about $11 billion through 1993.

Ms. KAPTUR. Oh, it was $11 billion expended already?

Mr. PETERSON. That includes civil service costs and what we have spent on the program both in definition and development.

Ms. KAPTUR. What percent of that was an overrun, of that $11 billion expended?

Mr. PETERSON. It is difficult to answer because I don't know what baseline one departs from. The original—the station program was estimated at roughly $8 billion in 1984 dollars, and that is going back many years to the early 1980s.

In 1987, we estimated that development to be $14.5 billion in 1984 dollars. And the program has subsequently gone through so many design changes and all, that it is difficult to know where you start from.

But in terms of perhaps where we started from in 1987, we really have not experienced an overrun to that estimate. What we had this last year was overruns contractually. And two of the estimates that we have provided the committee back in 1991, when we went through the restructuring where we reduced the cost projections for the program, I'm sorry. I am giving you a long-winded answer. I am afraid that it depends on what point you pick.

Clearly from the 1991 estimates, we did experience projected increased costs. And the redesign effort has resulted in a reduction of those costs.

Ms. KAPTUR. So it would be in total, then, $65 billion over 30 years, $11 billion of which was expended already?

Mr. PETERSON. Yes, ma'am.

Ms. KAPTUR. All right. For the new proposal——

Mr. PETERSON. Through the same period of time for 10 years, including the sunk costs—the same $11 billion in sunk costs, we are looking at an estimate of $47 billion, when we priced it. This is before taking into account——

Mr. GOLDIN. The 65 billion he was referring to was assuming that Space Station Freedom was 10 years and not 30?

Mr. PETERSON. Thank you.

Ms. KAPTUR. $65 billion over 10 years originally. Now you are saying $47 billion.

Mr. PETERSON. No. When I gave the $65, it was over 10 years. I'm sorry. We tried to do an apples to apples comparison. But it is $47 billion on equivalent terms, the same 10 years of operation.

Ms. KAPTUR. Under the new proposal, there are $11 billion of sunk costs that is not included?

Mr. PETERSON. No. The $11 billion is included.

Mr. GOLDIN. The total life plus 10 years of operation.

Ms. KAPTUR. Thank you.

Mr. STOKES. Are you finished?

Ms. KAPTUR. I am finished, Mr. Chairman.

Mr. STOKES. Mr. Delay, I yield to you.

Mr. DELAY. Mr. Chairman, I am coming back.

Mr. Torres, I would be glad to yield to him.

Mr. Torres. I yield to the gentlemen from Texas.

I think we have a vote, don't we?

Mr. Stokes. We are down to about three minutes now. I think we should go over and come back.

Mr. Torres. Yes.

Mr. Stokes. OK.

[Recess.]

Mr. Stokes. The committee will come to order.

Mr. Administrator, as we all know, it is 1994 numbers for space station under the President's recommendations, and I want to stress that. They assume that the 30 percent contractor personnel reductions will be made. And it will be our recommendation, also in the language, to ensure that that goal is attained.

The problem that I foresee is that unless we very quickly face up to terminating these contracts and getting the savings now that are assumed for the new station design, then we are lost before we start.

And I recognize that, politically, that can be very difficult. But unless we have the will to do it, then we are not going to be able to get there.

Is that your understanding, too, that in terms of the approach that we have to take at this point?

Mr. Goldin. Mr. Chairman, I believe that it is going to be a very difficult set of decisions. But unless we make the hard decisions and move as fast and as expeditiously as possible, we are not going to be able to have the cuts.

And as I testified before to this Committee, we will not be able to make every district and everybody happy, because if we do, we will not be able to get the cuts.

So we seek the understanding of all Members involved and ask them, we will consult, we will not specialize. But the fact of the matter is there will have to be cuts, and they will have to come somewhere. And we are prepared to do it.

Mr. Stokes. Dr. Gibbons, on this issue, is the commitment of the Administration behind this issue?

Mr. Gibbons. Mr. Chairman, the Administration recognizes the reality of the situation and also as Mr. Goldin has pointed out, it is not going to be an easy task, but the alternative is even less attractive so we are committed to the imperative for this to go forward. In fact the station simply can't go forward unless we go forward with this.

Mr. Stokes. This week's issue of Space News suggests that the European space agency may be rethinking its participation in the space station program. One ESA official indicated that Germany clearly thinks that Columbus, the European space station model, is no longer viable. Apparently the bottom line for the Germans and the Italians is that we haven't got any money, so it is possible that we have this obligation to our international partners.

Some of those partners may in fact be facing the same problems that we are and will end up vastly reducing their station contribution. I would be interested in any observations from either you, Mr. Goldin or from Dr. Gibbons.

Mr. Gibbons. Perhaps one of the best ways to respond, Mr. Chairman, is to read from a very brief letter that I received today from Jean Marie Lutent who is the director general of ESA in Europe in which he says, I am pleased to tell you that I consider this decision to be an important step in the right direction and would like to assure you that I am ready to continue our cooperation with NASA in the redesign effort to arrive at an optimized solution for all of our partners.

It is my understanding that while all of our partners are going to have to make some adjustments and some are not comfortable, that they feel that the direction taken now is threading the needle and that this direction is doable. And that they are partners with us and are going to see it through with us.

Mr. Stokes. Very good.

Mr. Goldin. I would like to state that before the redesign process started, all of our partners had expressed tremendous concern about the operational costs; those costs that would be borne after the space station was in orbit, and one of the great accomplishments of our team was to bring down those operational costs down by almost a factor of 2.

This is going to have a very positive influence on the budgets of our international partners, because they pay for 24 percent of the operational costs and relative to those budgets, these are big numbers. And I think they look very favorably and in their report to the Vest Panel they made very positive remarks about the reductions in operational costs.

Mr. Stokes. Isn't it also true, though, that our international partners are getting a pretty good deal with the space station when you consider that we are spending $30 plus billion to build virtually all the infrastructure, including the utilities, the data management system, and the power, while they come up and hook on with some very highly sophisticated laboratories? Would you agree with that?

Mr. Goldin. Well, I would say that America has taken a very bold step and we are doing a very, very large part of the work. We do want to work with our international partners, but the fact of the matter is, we are putting up the infrastructure. And they will be able to mount their modules on to it. And in return for that, we will receive rack space in their laboratories but the fact of the matter is, if you take a look at Option A as it is presently designed on the books, the United States will be building nine racks, which is a measurement, it is about 1 cubic meter of space, we will be building nine racks to the 30 racks that our international partners will be bringing to the station.

So to a certain degree, the focus for the international partners is on the product to which we get a chance to share in their labs and the focus for America to a certain degree is on building the infrastructure that makes it available to the international partners to participate in the Space Station Freedom.

Mr. Stokes. But doesn't that make the point even more clearly that under the new redesign our laboratory continues to shrink?

Mr. Goldin. The answer is that is one of the trades that was made in coming up with the simplified space station. And it will cause us, on a space standpoint, to be more dependent upon our international partners for utilizing their lab space to have enough lab space to carry out America's needs. We will have nine racks. They will have 30.

I believe in the European—in the Japanese module there are ten racks and America gets five of those racks and in the Japanese module there are 20 racks of which we get 10.

Mr. STOKES. Well, maybe you can tell me something that I just don't quite understand. We are building the infrastructure, we are spending $30 billion. And admittedly, we are now getting even less racks. Where is the good deal here?

Mr. GOLDIN. This is an international program and the quid pro quo as the program was defined was in return for hooking up to our infrastructure, we would get rack space inside of our international partners' modules. So we will take American equipment and put it into their modules.

Mr. STOKES. I guess the follow-on question would be that at the rate that we are currently funding, it is going to take quite a while for those modules to get up there; is that correct?

Mr. GOLDIN. I'm sorry?

Mr. STOKES. At the rate we are currently funding, isn't it going to take quite a while for us to be able to get those modules up there; the internationals?

Mr. GOLDIN. The internationals will be coming up a little bit later than originally planned. We don't have the exact number because of the situation that I stated. And we will be starting out with our nine racks that we have in our laboratory module and we will be there first.

Mr. STOKES. Mr. DeLay, I yield to you.

Mr. DELAY. Thank you, Mr. Chairman.

I will be as quick and as brief as possible. Most of the questions I had have already been asked. But let me start off by saying, I must be the only person confused in this room. Which design are we picking? Is it A–2? Is it A–1? Is it A–2 hybrid with B? Which one have we picked in relation to what we have been talking about all day?

Mr. GIBBONS. Let me see if I can respond to that. I think it is important for me to point out that we have been in the midst of a marathon and as we come to the end of that nine-day marathon, there is some reasonably well-defined opportunities out there.

I think that both the NASA study group and Dr. Vest's panel did enough analysis that one can get a pretty good picture of where we want to go. If I had—the difference between A–1 and A–2, for example, has to do with what particular kinds of altitude control and data systems you have on board, a few other minor changes and whether you go A–1 or A–2 depends on making some very careful cost trade-offs between the advantages of buying a system perhaps from the defense community that has been more thoroughly checked out and more fuel experience and may be less costly than going from one Freedom derived.

But these are detail choices that will lend themselves to analysis and resolution pretty quickly. So the President chose what he called the Modular Freedom Derived Station and we asked for a determination within, I think the number is 90 days on the specific details, milestones and the like, that will now come out of that decision.

But I cannot tell you today which of those two—for instance, control systems will be chosen because I don't think that is known quite yet.

Mr. DeLay. Is it safe to say C is out?

Mr. Gibbons. Yes, I think D is out, which is to mean don't do it. C is out for a variety of reasons that I think we have expressed. The fact that it would wipe out our chance of maintaining an international partnership, that it would not give us the capability to utilize the already expended investment in Freedom-type hardware/software.

That if we were starting from scratch, it would be a very, very challenging and probably viable option. But the facts of the matter are we aren't starting from scratch, so that brings you back to B or A.

And B in terms of its complexity, the amount of EVA activity required, therefore the risk factors and some other details push you down toward the A end of the line, which is Freedom derived also but has very important features that the advisory panel I think recognized clearly. And that is also what attracted the President's attention.

Mr. DeLay. OK. Well, as you can imagine, if I am confused and we go to battle next week with this bill asking the Members of the House to give us $2.1 billion for a space station but we don't know what it is, it is going to be pretty tough.

I understand the dilemma that you are in and the time constraints, but we also have Members that have budget constraints. And we also have people that don't want to make space station. Can we assume by the time we get to the Floor with our bill, we will have a better idea of which design we are voting on?

Mr. Gibbons. It might be helpful if we could get your thoughts on what particular clarification would be most important in this next week, because I think we probably could clarify many of the questions you have if we could get together on some of the specifics.

Mr. DeLay. OK. Well——

Mr. Gibbons. Perhaps we would be happy, and I am sure NASA would be happy also to respond to that.

Mr. DeLay. I think we are putting Mr. Goldin under a terrific bind thinking about the problem that we are going to be facing next Thursday or Friday or whenever we take up our bill. You may not know this but the present schedule, as I understand it, is Supercollider first and space station the next day.

Mr. Gibbons. I think that is right in terms of authorization and appropriation.

Mr. DeLay. We are put off until the following Monday? So you have a weekend, Dr. Goldin, to pass this bill.

Mr. Lewis. I'm not sure whether that helps or not.

Mr. Gibbons. I think your question is fair. Perhaps it will give us a heads up to try to see if we can't get sufficient additional specificity to this or pictures and otherwise of what we are speaking about. And obviously many things will have to remain to be decided but maybe if we could get enough of the major pieces clarified that it would be helpful to you in explaining it to the other Members.

Mr. DeLay. Well, having said that, my questions are difficult to ask, because I am not sure you can answer them. But they will give you a flavor of what the Members will be asking when space station supporters try to sell space station to them.

First off, assuming it is an A configuration, A–1 or A–2, what are we giving up in terms of science, manned capability, power, etc, going from Space Station Freedom to A–1 or A–2?

Mr. Goldin. I think it was—let me first deal with science and go to the Vest Panel report. I have a copy of it here and I am trying to find the right page. And I think it was the conclusion of the Vest Panel that all three options offered significant science and there wasn't a major differentiation between——

Mr. Vest. Dan, I have fully given you the quote here because we really said in summary, looking at the scientific and technological research utilization, our conclusion was that there were not sufficiently overriding differences among the three sets of capabilities for life science, human adaptation and micro gravity research, to consider it a determining factor in which option to go with.

So there are differences, trade-offs here and there, parallels, rack numbers but they are really in what an engineer typically call a noise level. They are not things that we thought were determining factors.

Mr. DeLay. Of A, B and C, but what about D? I am saying D is Freedom.

Mr. Vest. Oh, Freedom.

Mr. DeLay. I am talking about the three options versus Freedom. What are we losing?

Mr. Goldin. D in Freedom in terms of power, racks, science, capability, I think the only technical difference between Freedom and B had to do with a small simplification to the data system; is that correct, Bryan?

Mr. O'Connor. We made some simplifications in the communications and tracking area, we simplified the attitude control system somewhat. We removed a section of port truss and we have made some simplifications in the data management system.

Mr. Goldin. But that doesn't impact the science to any extent. It was just a simplification of the engineering part of the infrastructure, but from a science standpoint, B and what you called D are just about the same. The power delivered to the user, the science, the micro gravity levels, all the measurables that one has are just about the same. So I don't think that there is a difference.

Mr. DeLay. But we are not talking about B. I think I heard that Dr. Gibbons is talking about A–1 or A–2. What are the differences between A–1 and A–2 and Freedom?

Mr. Vest. Sir, if I might, on page 30 of our report is a very simple, that is high level table that compares A, C, B, and Freedom in terms of the basic parameters: crew size, voltage, racks availability to users and if you look at that, you will see that there are very few differences.

The primary differences as I recall between A and B largely had to do with the degree of sophistication and complexity of the data management systems and things at that level. Their fundamental characteristics are very similar. And A–1 and A–2 differ by what is used to accomplish the attitude control.

Mr. GOLDIN. And there was one other difference between A and B, because B did not have an alpha gimbal. It required a reorientation of the spacecraft every few days and that occurred between nine and 50 days on interval–A was the one without the alpha and as a result, it requires a reorientation.

So you would have to schedule your internal experiments that you going to be making to assure that you had the right attitude, so that would be another difference. But it was deemed by the Blue Ribbon Panel that it wasn't significant enough to cause us to differentiate on the scientific basis.

Mr. DELAY. The only real big difference that I see is that the international loses about half its power according to your chart SSF is 34, IHTC is 18 you lose half the power is that correct?

Mr. GOLDIN. Yes, we start out with lower power but eventually we build up to the higher power.

Mr. DELAY. Okay, that gives me a pretty good idea. You said earlier, Dr. Goldin that if we did nothing in response to Ms. Kaptur's question, manned space would be set behind by 20 years.

I understand that and I think it is very dangerous. At the same time, how many years are we setting it back by going the route of A–1 or A–2? I think I am hearing B is out too. I think we have it down to A–2 with a few modifications.

Mr. GOLDIN. Given the numbers we had, given a fixed funding, Mal Peterson has made some preliminary assessments, which are not the highest level because they have been parametric, but the international modules, the power module gets up there four months later for the level funding case and the international partners will be up on the order of two years later on the level funding case.

So that would be—again, it is a rough number.

Mr. DELAY. It looks like it is the same crew size as SSF.

Mr. GOLDIN. Yes, by the way if SSF went to level funding, it would also slip also. It is the dollar value that you are putting in per year. The thing that determines the schedule. So if we level funded SSF as we are level funding the Option A, the same thing would happen.

In fact it would slip out even more because of the higher level of dollars. So I don't think that that is a discriminator.

Mr. DELAY. I am going to get parochial on you. The final report to the President by your team states the following: The committee believes that the team's estimate of $300 million per year savings due to these management and operations changes is a minimum gain.

The entitlement from these improvements could realize a savings of up to $700 million to $1 billion range to NASA overall. Can any one of you tell me how this will affect the Johnson Space Center and how many jobs will be lost in Houston?

Mr. GOLDIN. I don't know how to address that. I have received the report from the——

Mr. VEST. I am afraid, sir, I cannot directly answer that question. But let me indicate that the management subcommittee that drew forward that conclusion, drew it largely on the basis of personal experience of its members, both in running very large military development systems, development and construction operations, and also two members, really, who have been through very similar restructuring in private industry.

So they were making a statement that really cuts across all these options about the level of redundancy that they felt could be cut out in order to run a more flexible and leaner organization. And they felt that there were more savings to be accrued than even the redesign team had come forth.

How that affects a particular center depends on the ultimate details of the option, and who becomes the final contractor.

Mr. GOLDIN. My sense in reading the report was that that did not apply just to space station but that the comment applied to NASA. Because if you took $1 billion out of space station in a year, I think it referred to NASA.

Mr. DELAY. I have seen figures that project that the jobs loss from the new Space Station Freedom options are as follows: 4,600 as a result of either Option A-1 or A-2; 2,000 to 3,000 as result of Option B; and 14,500 as the result of Option C. I believe this is NASA wide.

These figures supposedly come from data calculated by NASA's redesign team. Are these numbers accurate? And if this information exists, have you released it or do you have it?

Mr. PETERSON. Let me try to discuss this for a second. The current program funding level is about $2.15 billion. Depending upon the level of funding in the option, we will probably be funding the equivalent activity at $1.9 billion or $1.85 billion in 1994 at the $2.1 billion request level. That is, indeed $300 million worth.

And if you do the calculus on that, the calculation on that, you are going to have significant job loss. 4,600 turns out to be a preliminary calculation based on a different funding level assumption. So it would not be quite that great in direct job loss for the $300 million.

Mr. DELAY. At the redesign meeting in front of the Science Committee, Dan, you indicated that you were preparing a job impact report. Have the job loss numbers been finalized by NASA, and if so, could you provide them for this committee?

Mr. GOLDIN. The problem we had—I did review the data. The trouble is when you want to get specific to center, you have to know which option, which prime contractor, how the work force is going to be distributed and unfortunately there was a single point solution that didn't make sense.

But what we are going to do, as soon as I receive the instructions from the White House, is a very specific set of calculations for a real case, not a theoretical case, and we are going to take a look at not just the disruption that happens when we have to terminate contracts but we also bring contracts back on.

So what we want to know is what is the net job loss, not the initial disruption, because we will be bringing back other contracts. So it is a very complicated calculation, and the easy thing to do is to come up with an easy answer, but we are committed to sharing that data with the committee as soon as we have it and as soon as it is a credible set of numbers.

Mr. GIBBONS. I could add just a brief word to that. The President, when he first reviewed this whole situation, expressed considerable concern that the local and regional impacts of any Federal change in programs, defense conversions, space station change, whatever, take carefully into account the human impacts, and that we minimize the net impacts in these regions.

Mr. DELAY. I am glad to hear that. I have just one more question——

Mr. LEWIS. You might say I heard the same thing when they talked about base closing. I am going through my fourth base closing, and I am worried about it.

Mr. DELAY. Dr. Gibbons, is what the Administration supports consistent with what is in the NASA authorization bill, H.R. 2200?

Mr. GIBBONS. I believe so. Although there, I believe, at least to my knowledge, it is, Mr. DeLay. And I am sorry. I am not as familiar as I should be right at this moment in time with the side-by-side comparison. But I don't believe there are any major differences.

Mr. DELAY. Well, I've got more questions, Mr. Chairman, but I don't want to wear out my welcome. But I have to tell you, I am really concerned about the fight that we are about to have on the Floor of the House. I am sure the Chairman is going to take all this into consideration and he has got to make the call on the strategy.

But there are all these questions hanging out there while we're asking Members to vote for a space station and we don't even know what it is. In fact, in my opinion if they find out it is a lot of A, you have a risk involved in abandoning a plan which is underway and from which many of the bugs have already been worked out in favor of a plan that hasn't left the drawing board. This is no easy task.

Now, with the President's adamant support, I think we could probably win. But Dan knows how hard this fight is, when you have something you can put your hands on, like a little model on the desk.

We have got a tough battle. I want to help you as long as we have good science and good man manned capability with all the requirements needed.

Mr. GIBBONS. I am sympathetic with your concern. I do recall what Tom Jefferson said about the situation once, which I think is still relevant. He said, sometimes the right direction means change in course; a changing course is the right direction to go. And it seems to me that the evidence now before us in this design and in the careful review by independent peers say that the right direction is a change in course.

Mr. DELAY. Well, I hope that course doesn't run into a dead end. Thank you, Mr. Chairman.

Mr. STOKES. Thank you, Mr. DeLay. We will come back to you if you have something additional.

I want to go back for a moment to-Jerry?

Mr. LEWIS. Sir, you're up.

Mr. Stokes [continuing]. To a question we had about the racks and about the amount of money we are putting it in terms of the international.

And we go back to what Mr. DeLay was just talking about in terms of the selection of the modular approach, basically, upon Option A with some of the essential features from Option B.

And if I—correct me if I am wrong, but my understanding is that under A, we would have nine user racks; under Option B, we would have had 16 user racks.

Is that correct?

Mr. Goldin. Let me just check the numbers.

16, not 14? 16, yes, sir.

Mr. Stokes. So I am just trying to understand, wouldn't we be better off selecting the laboratory under B, if we are going to lose these types of racks, going from 16 down to 9?

Mr. Goldin. Right now we have nine racks in the U.S. module, and we will have 15 racks in the other modules. We lose a net of seven racks in going from B to A.

Let me see if I can rephrase your question. Can we configure A with a laboratory with 16 racks?

Mr. Stokes. Yes.

Mr. Goldin. The answer is we could certainly take a look at it. I couldn't answer off the cuff right now. That it is something that we could do immediately. I will say that one of the contractors has made such a suggestion and, in fact, delivered a proposal to my office, but just a few days ago.

We tried to drive to meet the schedule at hand, and we have not had a chance to completely and fully evaluate that.

Mr. Stokes. Well, I guess that is something that we are suggesting ought to be looked at. You know, we are reminded very much when back in 1986, originally when we were talking about this, we were talking about something like 44 racks on the U.S. lab alone, with two labs, I guess.

Let me go to another issue. One of the major issues looked at by the redesign team and the Vest Panel was at what inclination we should fly the space station. And clearly it is probably easier to launch it at a 28 degree inclination. But, on the other hand, if we want to have Russian participation, we may have to raise that inclination to at least 33 or 34 degrees, and possibly to 51 degrees.

I wonder if we could have Dr. Vest, who supports the 51 degree inclination in his report, give us a little thumbnail sketch on why the 51 degree inclination is important and whether it should definitely be included in the decision process.

Mr. Vest. Yes, Mr. Chairman. I think the—excuse me. The primary thing I want to make clear is that our advisory committee certainly viewed the possibility of having the Russians involved in terms of its international ramifications as a plus, a nice thing, a good thing to have happen.

But that sort of geopolitical argument was not the primary driving force. The real point, from our perspective, was that we have at the moment only one vehicle, putting this station into orbit. Namely, we are constructing it, lofting it, constructing it entirely with the shuttle.

There are possibilities that we could have another accident at some point in the shuttle that could close it down for a period of time. We have a very interesting table in here that shows periods of time over the last couple decades when various launch vehicles have been closed down.

We would like—we would like to think that it is a—it would be a positive feature to have more than one launch vehicle that could be used, not only U.S. but perhaps a Russian, perhaps others, that could go to the higher inclination. It has some other advantages.

One is, as I indicated in my formal statement today, we feel very strongly, as does the team, about supplying, at all times, an assured-crew-return capability in case someone gets injured, sick, there is an accident on the station.

The most logical thing to use there is the Russian Soyuz. As I understand it, we would currently be configured to have to rework a shuttle somewhat, bring the Soyuz over to this country, modify a shuttle, and use that to launch it.

If we were in the higher inclination orbit, it is my understanding that it could be launched using its own launch vehicle from the Soviet Union, from Russia.

So there are really a variety of things that come up in terms of safety, redundancy, and access to a greater number of countries, access to a larger number of landing sites in the case of having to return the crew from an emergency. We felt all of those things argued strongly for a higher inclination.

And there is one other factor that I don't personally weigh as heavily, but it is one to be considered and that is that, at the higher inclination orbit, earth looking activities would cover a greater percentage of the land mass of the earth.

So we felt that all of those argued strongly for serious consideration of going to the higher inclination.

Mr. STOKES. Is this a decision that is likely to be made say within the next 30 days or so?

Mr. GOLDIN. I believe if we are going to be able to meet the deadlines and schedules and costs that we have prepared, that decision has to be made no later than 90 days from now. And I really believe it will have to be made no more than 60 days from now.

It is a decision that we don't have a lot of time and latitude on.

Mr. STOKES. Let me add, is it also true that if we elect to go to a higher inclination, and even assuming we don't go to the 51 degrees but something less in inclination—isn't it also conceivable that we will need some type of enhanced shuttle performance?

Mr. GOLDIN. We will have to do it. There are a number of ways of accomplishing that. One approach is the advanced solid rocket motor.

The redesign—the space station design team and the blue ribbon panel both asked that we look at an aluminum lithium tank which makes up a good portion of the capability.

A third and perhaps parallel possibility is the heaviest payloads of the payloads that go up with the core modules, both for our international partners and the U.S. modules, perhaps it might be possible to launch those modules on an expendable launch vehicle with some kind of robotic carrier.

So I think we have to look at all the possibilities over the next few months and zero in on a very specific decision.

But, as I said before, the decision time is months, not years. We must make a decision in months; otherwise, we will not meet the cost objectives or the schedule objectives.

Mr. STOKES. You mention the aluminum lithium tank. And, as I understand it, we have to add about $94 million in 1994 and $91 million in 1995 to the numbers that we have been talking about for that tank, is that correct?

Mr. GOLDIN. Well, I think there are a number of parameters that enter. If we go to a higher latitude, like 51.6, and if there is Russian participation, there may be some offsetting savings that perhaps can cover the cost of the aluminum lithium tank. And I think what we ought to do is wait until we have the data. We haven't had enough time to consult with the Russians to see if their contribution might be able to offset some of the costs that we have to develop that extra lift capability to get there.

And, again, that is part of the uncertainty that I know that Congressman DeLay was so frustrated with.

Mr. STOKES. All right.

Dr. Vest, in your report to the President you did not select a single option.

Mr. VEST. That is correct.

Mr. STOKES. You did very clearly state that Option A and Option C were the two approaches that should receive further consideration. By saying that, you clearly put Option B—by saying that, I think that you clearly put Option B somewhat behind the other two, and I wondered if you could tell us what the rationale was for that recommendation.

Mr. VEST. Yes, sir. I think there are three basic points to be made.

The first one, which was stated just a moment ago, is that while there are modest differences in the research capability across these three options, we didn't think those variations were large enough to be determining factors.

When we looked after that at the risk factors, particularly the amount of extravehicular activity needed to assemble and maintain the two options, when we looked at the level of complexity of systems within B and A, we found A to be somewhat simpler in a way that we thought was a positive rather than a negative consideration.

And, finally, some non-trivial differences in cost. We felt that option A was more cost-effective and somewhat lower risk, at the expense of only a very modest change in the research capability.

So we felt that, of the two modular options, we would tend to go with the simpler one, which is A.

Mr. STOKES. Thank you very much.

Mr. Goldin, I understand you want to say something additional about NASP.

Mr. GOLDIN. I just wanted to say, more so than NASP, that I wanted to clarify a position. NASA is prepared to make tough decisions, and I wanted to just reiterate the context within which I answered the question on NASP.

The President has proposed a budget of $15.3 billion. If we have to live with a lower level budget—and that is the harsh reality–I just wanted you to be sure as the Chairman of this committee and I wanted the Members of this committee to understand, NASA is prepared to make hard decisions, and NASA is prepared to work with the committee in setting priorities.

I didn't want there to be any ambiguity on that point. We will not back off from that position. However, when Congressman Lewis asked me the question relative to the—where I saw NASP ought to be and where I saw the future of NASP, I felt I answered his question correctly and candidly.

But we will not shrink from the responsibility of making the hard priority decisions. And, in fact, I think it makes NASA a stronger organization when pressed with a budget problem rather than leaving it up to the Congress and punting. We are prepared to work with the Congress to make the hard decisions.

And I very much respect the words you used in your opening statement, and I ask you to call upon us to work with your staff to make those hard decisions, and we will work with the White House and work with you in making those decisions.

Mr. Stokes. Well, let me say how much I appreciate those words, Mr. Goldin, because I think it is important that, if we are undertaking this mission on behalf of the Nation, that we all try to go down the same road together and with the realization that these are some tough times in our Nation.

And the President is confronted with some very difficult decisions and particularly in terms of the economic situation in the country. It is going to be difficult for all of us, but that is in the tradition, I think, of America, that when we have a problem that we can collectively work together and meet our problems and solve our problems.

And I think that is what has stood this Nation in good stead for these many years. And I think this committee is prepared to try and do what it can in terms of aiding and assisting the President as he undertakes some of these very difficult decisions. And your cooperation and the tough stands that you have taken—and I really commend you for some of the tough stands that you have taken—they have been courageous stands, I think.

Earlier today, when you mentioned the fact that one of the contractors whom we had evidenced great concern about in hearings earlier this year, you said to us at that time that you were going to make some tough decisions and some that would not be liked by a lot of people, but at least they would be made in the interests of what was best for NASA and for the Congress and for the Nation.

And when you mentioned earlier that you had taken that action, I know that didn't come easy, and so I commend you for that. In the same spirit, I accept your commitment to work with this Committee to try to do what we have to do.

And, Dr. Gibbons, it has been good to have you here and candidly and forthrightly discuss some of these issues with us. And we know of your commitment and the dependence of the President upon you and the great job that you and Dr. Vest and all the design team and advisory board people who have been involved. This was a very, very important undertaking on the part of the country. And

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that is why I think we have to think of it not parochially but we have to think of issues of this sort in terms of the whole global scale.

And Dr. Vest, it has also been a pleasure to have had you before this committee. We respect very highly the job that you have done along with the members of your committee.

I would yield to Mr. Lewis for any comments he might have.

Mr. LEWIS. Thank you very much, Mr. Chairman.

I did want to mention just one thing before we adjourn this meeting.

The President needs to be involved to really make the case, here. That is very much the circumstance.

Housing programs and veterans programs have constituencies out there, and, boy, I can tell you their voices are heard around the Congress. And when we talk about a request of 15 billion plus—and this committee may be looking at something considerably lower than that—in no small part it is relative priority between accounts across the board.

If the President really wants us to pursue our work in space and aeronautics and the like, then at the very highest level, beyond just press releases, we need to hear from the President.

It is awfully easy to whack away at a space program unless you really believe it is important. And I know that you believe it is important. And if the President does, then he can really make a difference. His people can make a difference here.

Beyond that, Mr. Chairman, I very much appreciate your remarks as well. I worked with Jack Gibbons for a long time, and I have a great, great respect for his professional integrity in the work we have done together and his friendship as well.

And, Dan, you and I are beginning a very interesting and very valuable relationship. It is very important that we express our personal appreciation for the really phenomenal work, Dr. Vest, that you have been about, and the people who assisted you. It has been a very intensive effort. And we deeply appreciate the commitment that is involved here.

Thank you, Mr. Chairman.

Mr. STOKES. That concludes our hearing. We appreciate very much your attendance and your participation. Thank you.

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